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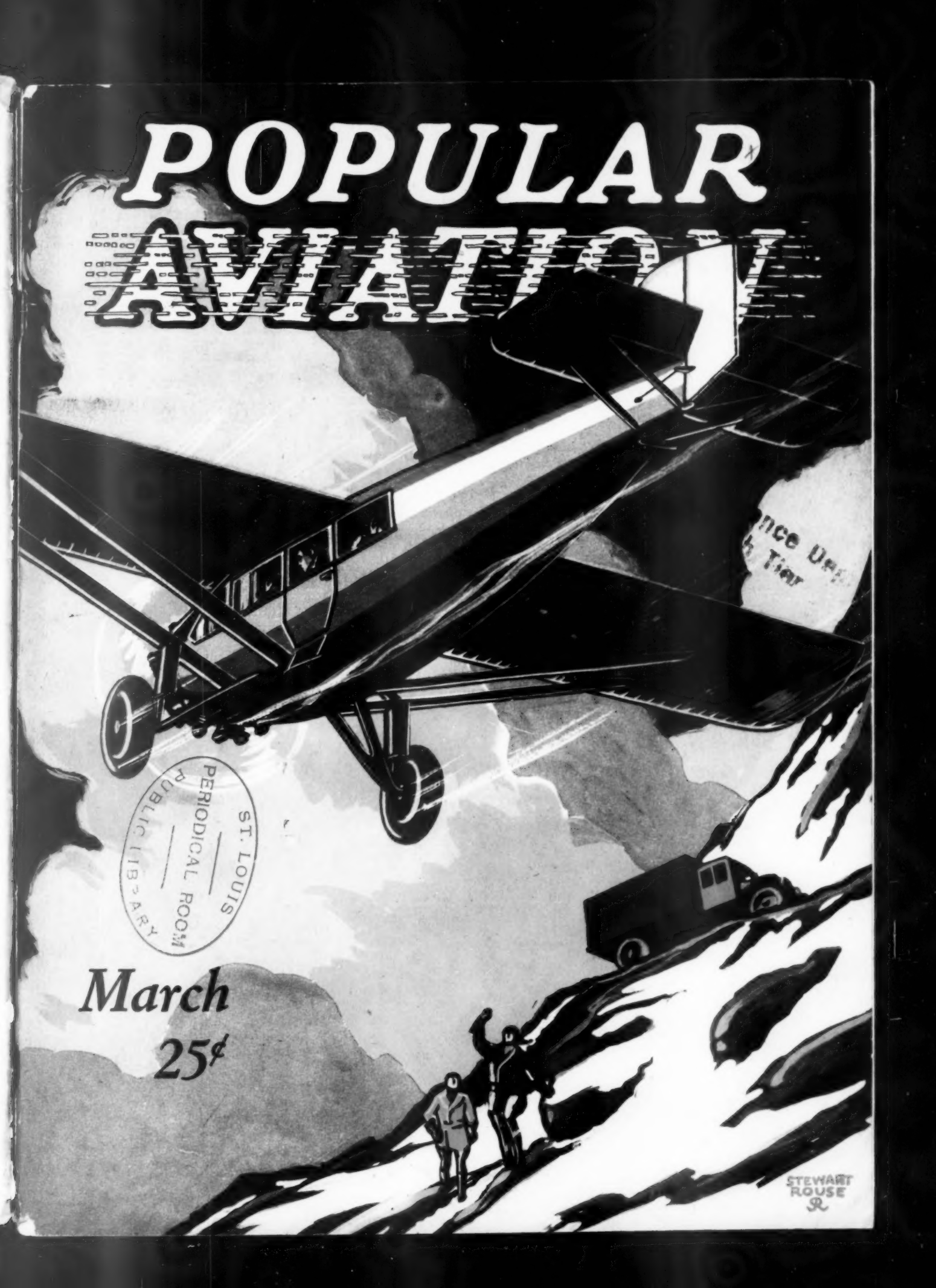

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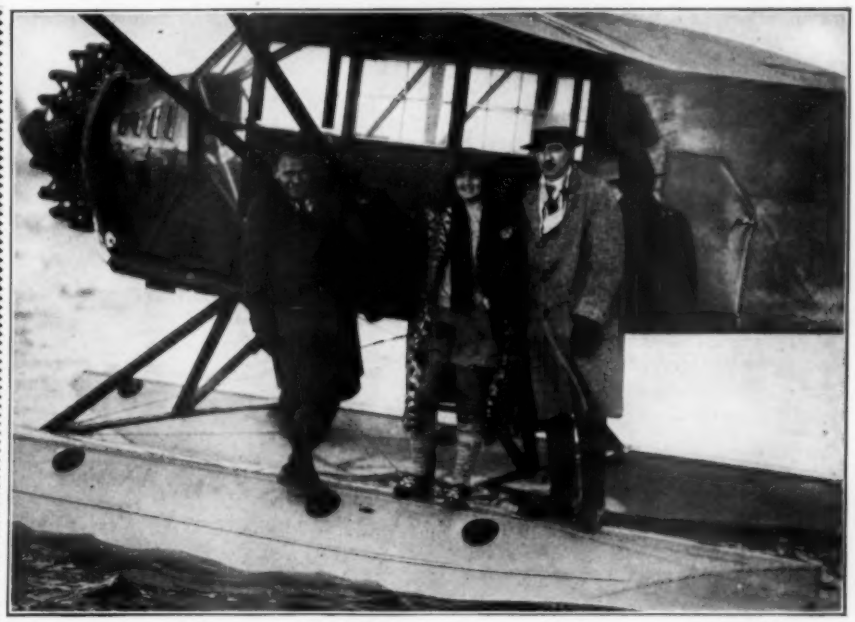

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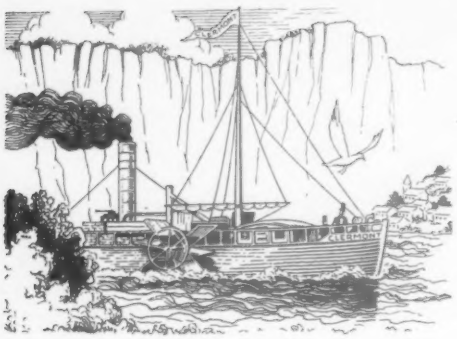
PIONEERS OF TRANSPORTATION



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On August 17, 1807, Robert Fulton's Steamship, the "Clermont" made its first run up the historic Hudson, from New York to Albany.

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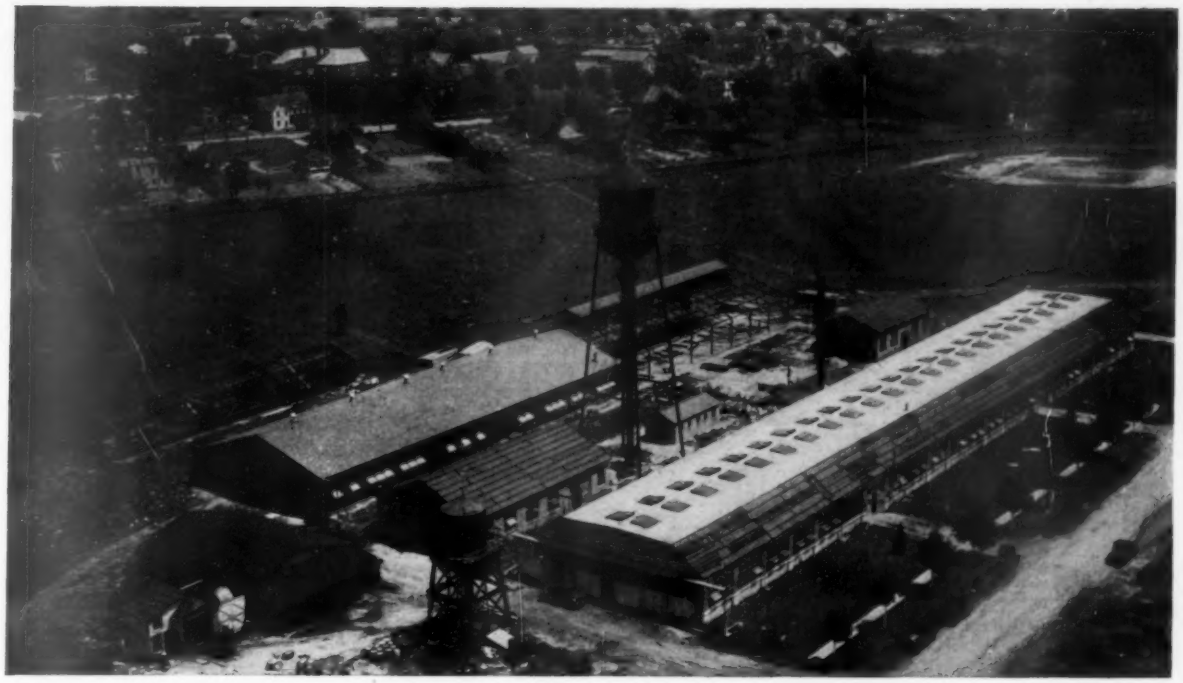


Factory of Fairchild Aviation Corporation at Farmingdale, L. I.

Aviation as a Business

By James R. Monroe

This is the first of a series of articles dealing with aviation as a business. Later articles, which will appear from time to time in Popular Aviation will take up in turn manufacturing, distribution, instruction and various uses of aircraft.

TO a great many men aviation represents a sporting adaptation of an invention, a more or less impractical utilization of a device found handy in times of war. Most of these people are willing to concede a great future growth for aviation but are rather disinclined to believe that aviation, as a business enterprise, is not only with us, but solidly entrenched.

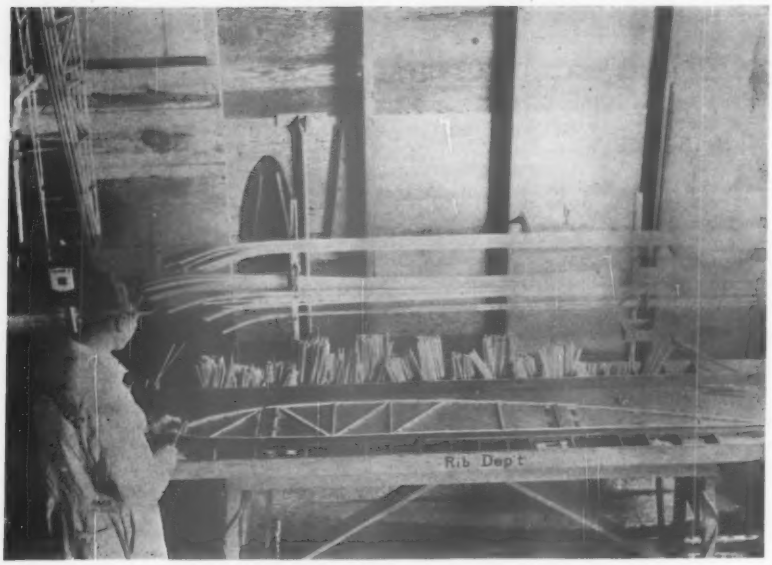
It was not long ago that radio was considered more or less as a scientific toy and a wonderful means of saving life on the ocean at rare intervals. Now that radio has taken its place as one of the foremost industries of the country we are under no misconception as to its importance.

There are several fundamental fallacies in the public mind when it deals with this business of aircraft and flying. One is that aircraft are only partially perfected and that present day planes represent only the crude beginnings of what the perfected plane of five or ten years hence will be. Another is that all planes, with the exception of military and naval planes, are made to order, and that the production of planes in factories is a more or less "custom-made" process. With this last fallacy is tied up the failure to realize that today the manufacture of aircraft is a business, with a market, and all the organization of any business to reach its market and secure contact with its prospects and customers.

It was not so long ago that the market for radio apparatus was regularly deadened by the circulation of reports that astonishing improvements were just around the corner, that the models to be displayed at the next Annual Show, would be such an advance as to scrap all previous devices. Year by year the report went out and year after year saw only regular and consistent progress in improvement. Radio men say today that such progress as has been made has been in refinement of design and minor changes, and that little of a revolutionary character has been incorporated into the many designs now on sale. (This in spite of the advertisers' frequent use of the word "revolutionary.")

Aircraft occupies much the same position. People look for revolutionary changes in aircraft design, forgetting that such changes and improvements as have been made have been in essence minor changes and adaptations to newer conditions and demands.

Prophecy is a dangerous business, particularly when the forecast is placed in cold type. So it is not quite safe or wise to say that many of the current ideas about aircraft may never become a reality. However, to take one illustration: Possibly the commonest idea in the public mind, when thinking



Jig used for rib assembly in plant of Mahoney Aircraft Corporation, San Diego, Cal.

of improved aircraft, is that some form of helicopter will be the plane of the future.

Helicopters have been flown with more or less success, but little has been done with them up to the present. To many thoughtful men the helicopter offers little in the way of advantages to offset the disadvantages so far encountered.

If you carefully trace the gradual change in airplane design you will note that little has been done to the original models except to make them more comfortable and less hazardous. The pilot's seat has been moved about, the position of the motor has been changed, seats have been enclosed instead of being left open to the air, and wings have been modified. We cannot even state for a certainty that the various control surfaces have been definitely located, as even today we have the revival of the Canard with its front elevators.

Such changes as have been incorporated into the latest planes consist rather of refinements of design. The parallel case is the motor car. Little of revolutionary character has been introduced in that business, as in the radio, yet because of the recent popular interest in aircraft the public believes that radical changes are to be expected.

We may be on the verge of great changes, but the consensus in the industry is that the improvements will be in the matter of the selection of materials and in the power plants, rather than in design.

This stabilizing of design is an indication that the forward looking minds in the industry are chiefly intent on improvements that will add to sales value and not detract from performance. Naturally constant experiments are made, just as in the motor car industry, to add to performance, but in considering the industry as a going business we should not take into account the experimental features that are a part of all our large industries.

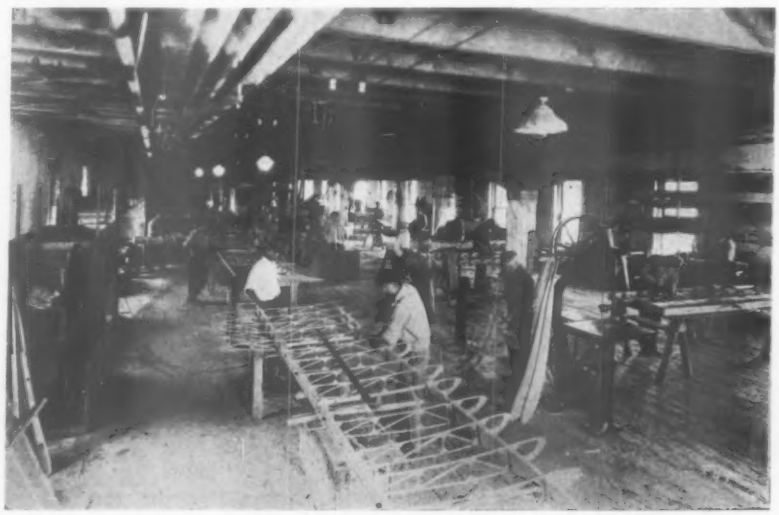
The public in general are not so aware of the limitations of aircraft as are the manufacturers themselves. Any machine, as a machine, sets up for itself certain definite limitations. Our railroads are an example of the vast development of a strictly limited form of transportation. Today we can imagine the arguments brought forward to prove that the railroad could not become a successful carrier. In fact, we can turn to the old newspapers and find that railroads were too limited in several important ways ever to become practical. Tracks had to be built at great expense over carefully prepared roadbeds. Once built the tracks definitely limited the movement of the train. For a lengthy trip the engine could just barely pull its own fuel, with little payload left. So the indictments against the railroad piled up until it seemed impossible that with all the limitations imposed that the steam locomotive running on rails could ever be a success.

Airplanes are manufactured today by men who are aware of the natural limitations imposed on their product. They are developing their product right up to the point where the limitation begins and are prepared, through their experimental departments, to extend the performance of their product as soon as these limitations are reduced.

To illustrate, two of the present limitations on aircraft are the necessity for a run at the time of take-off and landing, and the fact that flight requires a definite speed while in the air. These are limitations but do not hamper progress.

The fact that manufacturers are in production today on a standardized product, with a known market and an organization with which to reach that

Waco wing assembly line at plant of Advance Aircraft Company, Troy, Ohio.



market may come as a surprise to some people. It has been a matter of some surprise to the financial interests who, apparently, have just discovered aviation.

So far there has been no mass production of airplanes, but there are factories in which production is scheduled and mass methods are employed, so that future increases can be taken care of without a complete rebuilding and rearrangement of equipment.

An airplane is an assembly of body, wings, power plant, and a device to sustain the plane when at rest, either a wheeled landing gear or floats. To take the motor car industry as a parallel again, there are many producers of automobiles who do not manufacture their entire cars. Engines are purchased from specialists; wheels, and even bodies, are bought for assembly in the plant. With the aircraft industry the same conditions prevail.

The manufacture of new production ships involves fuselage construction, wing and tail surface construction, motor work, including test and mounting, instrument and accessory mounting, rigging and finishing.

The fact that an extremely high grade of work is an essential is no bar to modern production methods. To take the wing assembly as an example, ribs are made in quantity, using jigs for the purpose of getting uniform and speedy production. The ribs are assembled with the spar or spars and all bracing applied. The uncovered wing is moved forward through the production line receiving its covering, meeting the assembled fuselage and step by step the rapidly assembled plane moves toward the final and finishing stage.

Initial steps in fuselage construction at Alexander Company plant, Denver, Colo.

The completion of the airplane, followed by a flight test, simply closes the manufacturing operations. It is true that there are many companies operating that could sell their entire production directly to the consumer, making deliveries at the factory field. However, the forward looking organizations producing airplanes are interested in building up a dealer organization comparable, in most respects, to the organizations in the automobile field.

With this in view sales are handled by distributors at various points, distributors keep ships in stock and deliveries are made to the purchaser on the distributor's field. In many cases the distributor and his customer fly the ship from the factory, a condition that frequently prevails in the motor car business.

The sales problem confronting the industry is a complicated one and will be dealt with at greater length in a later article.

Part of Travel Air finishing department at Wichita, Kansas.

Halifax-New York Service

An air line between Halifax and New York City for the carrying of freight, express and mail, it is said, is being considered by Halifax business interests, says a report from Consul Erik W. Magnuson, Halifax, to the Department of Commerce. The geographic position of Halifax, it is stated, is very favorable for the development of Halifax as an important airport.

It is also the intention of the Post Office Department and the Department of National Defense to cooperate in experiments in carrying mail by air from Halifax to Montreal and Ottawa during the coming winter season. If these experiments prove successful, then in all probability the service will be established and the carrying of mails by air routes between the two ocean ports of St. John and Halifax to Montreal will be let out by contract, it is believed.

France in the Air

By Paul E. Lamarche, Jr.

A busy scene at Le Bourget Airport. Farman Goliath to left; the other is a Bleriot.

THE thirteenth of January of this year marked the twentieth anniversary of the first flight to be made in France. This famous flight took place at Issy les-Moulineaux, just outside of Paris, when Henry Farman, flying in a machine built by Gabriel Voisin, covered the distance of a kilometer at an altitude of 25 feet over a closed circuit. Shortly thereafter, Louis Blériot in a little monoplane of his own design, astonished his countrymen by remaining in the air for eight minutes and twenty-four seconds during a flight over a closed circuit between Toury and Artenay. A year later this same air pioneer accomplished the then unheard of feat of crossing the English Channel between Calais and Dover and was acclaimed by everybody as one of the greatest heroes of his time. Louis Blériot and Henry Farman, whose planes are now famous all over the world, were among a number of great pioneers in France who have been largely responsible for the great strides that have taken place with aviation, France has been one of the foremost pioneer nations in this new science and has held an enviable record in the present day development of the airplane. It was only natural, therefore, that France should be one of the pioneers in the development of commercial aviation, and when the time came to inaugurate such services they were prepared to show that the airplane could serve a useful end in peace as in war. Today France has one of the largest commercial air services in Europe with her planes operating daily over 7,500 miles of air routes. Flying across the Channel is accomplished several times a day as a result of the development of these air lines and now seas as large as the Mediterranean are crossed by planes regularly in maintaining intercourse between France and her African colonies, while this year will see a regular service over the South Atlantic established between France and South American cities as far south as Buenos Aires.

The development of this vast network of air lines has, like in other European air lines, taken place since the war although such a project was a much discussed subject before the war. Lack of sufficient public interest, inadequate equipment or the expenses involved, however, in many cases prevented such ideas from materializing. In pre-war days the airplane had hardly reached a stage in development to make it practical for such purposes, nor did the public show much faith or confidence in the airplane as a means of transit. The war, however, saw a great development in aircraft, and at the close of hostilities the interest in commerical flying was revived everywhere when it was realized that the time had come for people to fly to their destinations, but it remained to be seen how the public would take to the available services. France had a number of good pilots disbanded from the air service at the close of the war as well as a number of war machines ranging in size from diminutive Nieuport Spads to the big Farman bombers. Aircraft factories such as the Blériot plant were able to turn out as many as three hundred planes a month during hostilities, and there was much material on hand when the war closed which could be available for commercial purposes. In short, France had at the end of the war a nucleus for a peacetime commercial air fleet.

The first attempts at commercial flying were made in 1919 and were largely experimental. People interested in French commercial flying regarded the Paris-London route as one of the most important and one that was destined to be popular and well patronized. In 1919 two companies began daily services over this route, the Compagnie des Messageries Aériennes and the Compagnie Générale Trans-aérienne, who used small Bréguet planes to cover this distance of 225 miles or 400 kilometers. From the first of September to the first of December of that initial year they made a total of 322 trips over a total distance of 126,000 kilometers and carried 624 passengers of whom the majority were English. On the other hand, a creditable amount of baggage, freight and mails were carried across the Channel and these services were quick to find patronage among the couturieres and large business establishments for speedy deliveries. Passenger services in those early days were often more adventurous than anticipated and the equipment could hardly be compared with that of today. Forced landings were by no means uncommon and customers were often hard to get. Often they carried nothing but mail in carrying out their uncertain schedules. It was an experiment and one that was slow to take with the public. The growth of the commercial services from

this humble beginning is shown on the accompanying chart, which lists new companies as they were created year by year to the present. The type of equipment, price of transportation at the time of inauguration, length of flight, and the time schedule are shown as far as possible. The lines established during preceding years are not listed with those established during the succeeding years, since their service has remained the same except where changes are noted. Several, however, have discontinued service since they did not prove sufficiently successful. The Paris-Le Havre line existed for two years, operating only during the summer to correspond with trans-Atlantic liners using the port of Le Havre. The lines between Paris-Cabourg, Nimes-Nice, Bayonne-Bilbao and Algeria-Marseilles likewise did not prove successful.

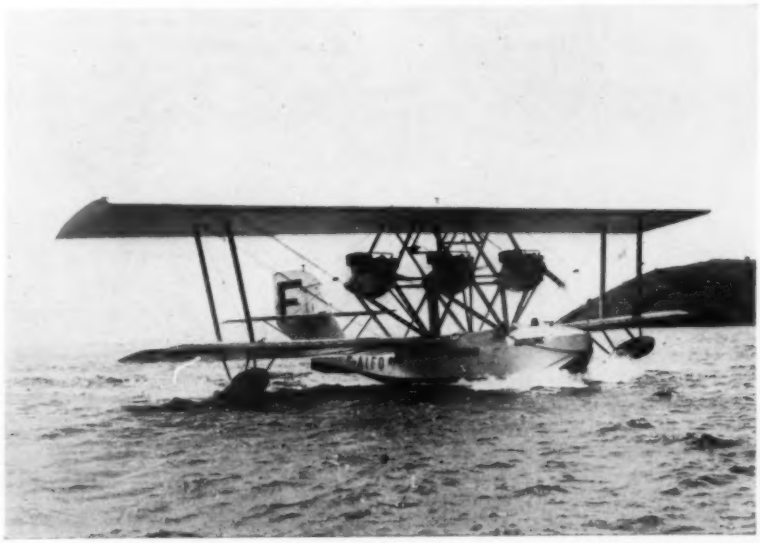
(The chart mentioned in the above paragraph will be found on pages 16 and 17. In estimating the cost of passage on French lines a convenient method is to calculate one franc as the equivalent of four cents.)

Commercial flying in France today is divided by four principal companies, who represent consolidations of the smaller organizations who were operating in the earlier years of commercial flying as shown in the chart. These are the Air Union, the Compagnie Internationale de Navigation Aérienne C. I. D. N. A.), the Société Générale de Transport Aérien (S. G. T. A.), and the Compagnie Générale d'Entreprises Aéronautiques (C. G. E. A.).

A Farman Goliath on the Paris-London Service, equipped with two Salmson air cooled motors. Carries 16 passengers.

The Air Union represents the companies who formerly operated over the Paris-London route and is considered one of the most important of the four operating companies. In addition to the London-Paris service it has also a service between Paris and Marseilles, with a stop at Lyon and further Mediterranean connections which provides a direct connection from London to the Riviera that has proven to be popular. The London-Paris service soon learned that much competition would exist between theirs and the British London-Paris line and it was not long before a rate war developed. Twenty guineas, the original one-way fare (equal to $125 in our currency) seemed a very high price and the French quickly reduced the fare to the equivalent of fifteen guineas and then to ten. It brought customers to the French line and finally after a government subsidy had been granted they were able to make a greater reduction, making the one way fare the equivalent of six guineas in francs. This for a time made it impossible for the British to compete and for a period of nineteen days during 1921 the British service was forced to discontinue altogether. When the British finally received a subsidy from their government they were again able to continue. France was one of the first nations to subsidize their commercial air fleet and their action resulted in forcing competitor nations into doing the same. Practically all of the important air lines of Europe at present operate on government subsidies. More recently and within the last few months, another rate war developed between these two services when the French started by reducing the fare for the one way trip to 600 francs (equivalent to $24). The British then announced that their price would be reduced from 650 francs to 575 francs and eventually they adopted a scheme whereby a first and second class service was inaugurated. The first class fare is now 575 francs and that of the second class 465. The same equipment is used in both services but the hours of departure in the second class are not as convenient, while the newer and somewhat more commodious planes are in the first class service. Despite the excellent equipment which this service has at the disposal of passengers, the English service usually carries more passengers every year. The French have made all efforts to secure a greater share of the cross-Channel passengers,

A Meteore Flying Boat, equipped with three 180 hp. Hispano motors, at Ajaccio.



Plane used at LeBourget for le baptee de l'air, or first flight so popular with enthusiasts in Paris.

but English passengers usually prefer their own planes and Americans, who constitute a large percentage of this traffic, frequently take the British service. French cross-Channel service has largely depended upon the tourist traffic of other nations, and figures show that the total number of passengers carried during 1926 was less than the 1925 total, due chiefly to British competition. The French people are not as air-minded as those in competitor nations, and despite the efforts of years of air propaganda they do not fly to their destinations.

The C. I. D. N. A. line represents the old Campagnie Franco-Roumanie, whose planes extend their services through Central Europe to the Middle East. In its present operation it connects Paris with Strasbourg in two hours and a half, Prague in six hours and a half, Warsaw in nine and a half hours, Belgrade in twelve and a half hours, Bucarest in sixteen hours and a half and Constantinople in twenty hours and a half. An idea of the time that can be gained by utilizing the airplane as a quick means of transit is shown in the fact that the Simplon Orient Express, the fastest connecting train between Paris and Constantinople, requires sixty hours to reach its destination.

The S. G. T. A. line was formerly known as the Farman line and operates planes of the Jabiru type as far as Amsterdam from where connections can be made with the Danske Luftfartselskab, the Danish line, that will take the passenger northward to Copenhagen from where connections can be made for Malmoe, Sweden. Another branch of this line alternates with the Deutsch Luft Hansa, the German line, in maintaining a service to Berlin by way of Cologne. During 1928 this line plans to inaugurate a service from Paris to Rome by night, using a Farman plane equipped with berths like those used on two German lines.

The C. G. E. A. line comprises the Latécoère system, and has also taken in several smaller companies operating in the south of France. Their longest route is that connecting France and Spain with the African colonies and their present system extends as far south as St. Louis on the West African coast. The development of this system to this point is the beginning of a transatlantic project that will terminate in Buenos Aires, and the French have been working on this for a long time. The disastrous attempt of St. Roman in his huge Farman Goliath, the "France-Latin Amerique," last year to cross the South Atlantic was but one of many experiments that have been conducted by the government. The recent success of Costes and Le Brix in their famous Bréguet has paved the way for what is to follow. Outlined plans for this project call for an extension of the service from St. Louis to the Iles du Cap Vert off the African coast by flying boat. A small fast packet boat will at first be used to make the crossing from that point to the Ile de Saint Paul off the Brazilian coast, from whence airplanes will continue the service to the Ile de Norona, Natal, in Brazil, Pernambuco, Bahia, Rio de Janeiro, Montevideo and thence to Buenos Aires. When this service is established it will be possible to go from France to the Argentine in five days as against fourteen which is the time required by steamer service from French or other Mediterranean ports. The service will be put into operation this year and will be used at first to carry mails principally. Such a service is feasible, as has been conclusively proven by the successes of those who have covered this route, such as Franco, de Pinedo and others. It will keep France abreast of the ambitions of other nations who dream of spanning the seas with their aircraft. Even now Germany is building a dirigible for this same route, while Spain and England are likewise planning similar services.

Geographically France is fortunate in having a central position in Europe. It lies between the British Isles and Central Europe as well as between Northern Europe and the Mediterra-

A Bleriot Spad used by the Air Union on the Paris-Marseilles route. Equipped with Rhone-Gnome-Jupiter motor.

nean, and as a result aviation has every chance to prosper there. Paris with its splendid airport of Le Bourget, one of the largest and best equipped in Europe, naturally becomes the center of French flying. At this field planes from many nations arrive and depart daily and connections can be made that literally carry the air voyager to the ends of the earth. Not only does the field serve as an airport for three of the four principal air lines in France but it is the home of the 34th Air Squadron of the French Army, as well. This airport is visited by German Junkers, Dutch Fokkers, Handley-Pages from London as well as many others. An example of the number of planes using this port is shown in the fact that in August, September and October of 1926, 3191 planes arrived and departed carrying 10,923 passengers and 338 tons of freight. Only one plane has so far landed there on a direct flight from New York, and a little tablet in the ground commemorates the eventful evening of May 21st, when Lindbergh's "Spirit of St. Louis" touched French soil and made history.

A variety of planes and motors, of which many planes are noted in the chart, are used on these lines. The principal planes now used are the Farman Goliath and Farman Jabiru planes, the Blériot Spad and the Bréguet Berline, the Potez, the Lioré et Olivier and others. The Loiré et Olivier planes are used in the Air Union service to London and two have been equipped as restaurant planes, thus providing meals for the business man who can finish his affairs in Paris in the morning and be in London without loss of time for lunch for the entire afternoon. Nowadays the majority of planes in commercial service in France make use of air cooled motors. Of these the Rhone-Gnome-Jupiters, Salmsons, Bristol-Jupiters and Renaults are the most used. Of the water cooled motors the Hispano-Suiza, Lorraine Deitrich and Farman motors are the most popular and efficient. Often a motor on a plane can be used for 400 hours, after which in some cases it is given over to army planes. Regular overhauls usually come after every sixty hours of service.

Four passenger taxi plane of the Compagnie Aerienne Francaise.

The total receipts for 1926 from the four companies amounted to 21,300,000 francs. The gross receipts amounted to 87,800,000, which includes subsidies from foreign countries amounting to 8,300,000 francs, as well as a subsidy from the French government that amounted to 57,600,000 francs. The total expenditures of these four companies amounted to 88,400,000 francs, which was in excess of the gross receipts. The French 1927 budget provided for an appropriation of 185,000,000 francs and they contemplate a credit of 195,000,000 for civil flying in 1928.

The French government in co-operation with the air companies to whose support it contributes is bending every effort to spreading air propaganda among the French people and bring about a more air-minded nation. The number of air enthusiasts in France are unfortunately too few, but those who are have done much to bring about the wonderful development of commercial flying in France. The year of 1927 has been a wonderful year for aviation, not only in America but practically all over Europe. The epoch making feats that have been accomplished have been a great incentive to other nations to boost aviation and France has not been lacking in this respect. The French have always been eager to lead in aviation and have always held a high place among other nations. Much interest will be shown by the French and other aeronautical enthusiasts with the inauguration of the South American service. It should be a good year for French aviation. They have the experience, the equipment and the pilots, who have the indomitable will to succeed.

The number of passengers carried on the combined four operating companies is less than those carried by both English and German services. In 1926 French planes carried 18,800 passengers, while English planes carried 20,367 passengers and German planes found 56,268 customers. On pages 16 and 17 are figures that show the expansion of this air traffic since the initial year of commercial flying in France:

A Farman Jabiru, carrying eight passengers, used on the Paris-Amsterdam line.

Growth of Commercial Aviation in France

Line	*Operating Company*	*Planes Used*	*Price (In Francs)*	*Length*	*Schedule*
		1919			
Paris-London	Cie. des Messageries Aériennes	Bréguet	800 one way 1500 two ways	400 kms. 2 hrs. 30	Daily
Paris-London	Cie. Générale Transaérienne	Bréguet	1500 two ways	2 hrs. 30	Daily
Toulouse-Rabat	Cie. des Lignes Latécoère	Bréguet	1340 one way 2275 two ways	1758 kms.	Daily
		1920			
Paris-Brussels	Cie. des Messageries Aériennes	Bréguet, Salmson	300 one way 450 two ways	300 kms. 2 hrs.	Daily
Paris-Brussels	Société Farman	Farman	450 two ways	2 hrs.	Daily
Paris-Strasbourg-Prague	Cie. Franco-Roumanie	Potez, Salmson	1500 one way 2400 two ways	900 kms. 8 hrs.	Daily to Strasbourg Thrice weekly to Prague
Paris-Geneva	Cie. Aéro-Transport	Sopwith (Eng.)	900 one way 1500 two ways	470 kms. 4 hrs.	Once weekly
Toulouse-Casablanca	Cie. des Lignes Latécoère	Bréguet, Salmson	1680 one way	1850 kms. 30 hrs.	Twice weekly
Bordeaux-Toulouse-Montpelier	Aéro Transport Ernoul	Salmson, Sopwith	470 one way	460 kms.	Daily
Paris-Cabourg	Cie. des Messageries Aériennes	Bréguet, Salmson, Sopwith	500 one way 900 two ways	190 kms.	Weekly
Nimes-Nice	Cie. Aérienne Française	Dorand	300 one way 500 two ways	320 kms.	Twice weekly
Bayonne-Bilbao	Cie. Franco Bilbaine	Farman, Tellier (Flying boats)	250 one way	160 kms.	Daily
		1921			
Paris-Prague Extended to Warsaw	Cie. Franco-Roumanie	Potez, Salmson	1450 one way	1500 kms. 13 hrs.	Thrice weekly
Paris-Havre	Cie. des Messageries Aériennes	Bréguet, Blériot	200 one way		Twice weekly July & August
Bayonne-Bilbao Extended to Santander	Cie. Franco-Bilbaine	Levy (Flying boat)	150 one way	220 kms.	Daily
Paris-Lausanne	Cie. Grands Express Aériennes	Bréguet	400 one way	430 kms.	Weekly
Antibes-Ajaccio	Cie. Aéro Navale	Donnet, Denhaut (Flying boats)	205 one way	240 kms.	Weekly
		1922			
Paris-London	Cie. des Messageries Aériennes	Farman, Bréguet,	300 one way	400 kms. 2 hrs. 30	4 to 8 daily
Paris-London	Cie. Générale Transaérienne	Bréliot			
Paris-Prague-Warsaw Extended to Constantinople	Cie. Franco-Roumanie	Potez, Salmson	1100	2800 kms. 20 hrs. 30	5 to 6 weekly
Casablanca-Rabat Extended to Fez-Oran	Cie. des Lignes Latécoère	Bréguet, Salmson	500 one way 800 two ways	700 kms.	Twice weekly
Paris-Lausanne Extended to Geneva	Cie. des Grands Express	Farman	680 one way	850 kms.	Weekly
Algeria-Biskra-Dakar-Kayes	Sté. de Reseau Aérienne Transafricain		380 one way 600 two ways		Thrice weekly
		1923			
Paris-London (Reorganized)	Air Union	Farman	300 one way	400 kms. 2 hrs. 30	Several daily services
Paris-Brussels Extended to Amsterdam	Air Union	Farman	400 one way	455 kms. 2 hrs. 45	Daily
Marseilles-Perpignan-Barcelona	Cie. des Lignes Latécoère			379 kms.	Daily

Growth of Commercial Aviation in France

		1924			
Constantinople-Angora	Cie. Génèrale d'Entreprises Aériennes	Potez	400 one way	3 hrs. 30	Daily
Allicante-Oran	Cie. Génèrale d'Entreprises Aériennes (Formerly Latécoère)		385 one way 685 two ways	305 kms. 3 hrs.	Four times a week
		1925			
Allicante-Algeria	Cie. Génèrale d'Entreprises Aériennes		Mail only	2850 kms.	Once weekly
Casablanca-Dakar Extended to Agador, Cap Juby, Villa-Cisneros, Port Etienne and St. Louis	Cie. Génèrale d'Entreprises Aériennes		3260 one way 5800 two ways		Once weekly
Paris-Constantinople Extends to Bucarest	Cie. Franco-Roumanie	Potez	2650 one way	2757 kms. 16 hrs. 30	Daily
Constantinople-Angora Cancelled because of German intervention	Cie. Génèrale d'Entreprises Aériennes	Potez	See above		
		1926			
Paris-Lyons-Marseilles	Air Union	Blériot Spad	900 one way	1106 kms.	Daily
Paris-Cologne-Berlin	Société Farman	Farman (Jabiru)	1080 one way	918 kms.	Daily alternation with German line
Lyon-Geneva	Air Union	Blériot Spad	160 one way	115 kms.	Daily
Marseilles-Algeria		Métèore, Lioré et Olivier (Flying boats)			
		1927			
Ajaccio-Tunis	Air Union	Lioré et Olivier (Flying boats)	600 one way	620 kms. 4 hrs. 30	Twice weekly
Antibes-Tunis	Air Union	Lioré et Olivier (Flying boats)	1000 one way	860 kms. 8 hrs. 30	Four trips weekly
Marseilles-Algeria (Discontinued)		Métèore (Flying boats)			
		PROPOSED FOR 1928			
Alep-Bagdad	C. I. D. N. A. (Formerly Cie. Franco-Roumanie)				
Paris-Treves-Sarrebrück-Luxembourg	S. G. T. A. (Formerly Farman)				
Marseilles-Cannes	Air Union	Flying boats			Winter service
Paris-Rome	S. G. T. A.	Farman (Equip. with berths)			Night service
Dakar Extension to South America as far as Buenos Aires	Cie. Aéro Postale (Also Cie. Gén.-d'Entreprises Aériennes)				

The adjoining table, referred to on page 15, shows the distances travelled and weights carried, together with number passengers. A convenient way to reduce to figures to familiar ones, is to estimate a kilometer as three-fifths of a mile. A kilogram is two and two-tenths pounds.

Year	Distance (in kilometers)	Passengers	Freight (in kilograms)	Mail (in kilograms)
1920	850,000	1,770	77,000	15,600
1921	2,350,000	10,600	261,890	34,800
1922	2,800,000	9,500	556,000	167,500
1923	3,389,000	11,600	969,000	328,400
1924	3,648,000	16,700	877,600	532,700
1925	4,713,000	19,600	949,100	890,000
1926	5,220,000	18,800	1,067,800	594,900

Left Bank (Note the Body English).

A Chair-A Stick-A Radio

By Willis Parker

WE never will know just how many of the thousands of radio fans in the middle west and Rocky Mountain regions placed kitchen chairs before their receiving sets, seated themselves more or less comfortably with their left hands firmly grasping broomsticks between their knees and eagerly followed a course of ten lessons on how to fly as presented over Broadcasting Station KOA, Denver, by Chief Pilot Cloyd P. Clevenger of the Alexander Aircraft Company.

The fans were assured that, if they supplied themselves with kitchen chairs and broomsticks, they could get more out of the lessons than otherwise. However, the chair and broomstick idea were more for the purpose of creating atmosphere than anything else, for it is obvious that learning to fly by radio or by a correspondence course is out of the question. The entire purpose of the radio lessons was to create air-mindedness and arouse in the listeners a greater desire to learn to fly. Each lesson was fifteen minutes long and they were given Friday evenings from 8 to 8:15 o'clock.

To arouse interest and hold the attention of the unseen audience and create aviation enthusiasm, the lessons had to be entertaining and chuck full of "atmosphere." To do this, the lessons were not presented directly to the audience, but the listeners received the information secondhand through Clevenger's efforts to teach an alleged gawky rube how to fly. The alleged rube was none other than Gene Lindberg, one of the most popular newspaper humorists in the Rocky Mountain region. Gene's comments upon the pilot's instructions, his remarks concerning the various parts of the plane, his soliloquies while "in the air" provided enough clean amusement to prevent radio fans from turning to other stations where jazz orchestras might be performing. There was also a fortunate coincidence in names, for Gene's name is exactly the same, as far as pronunciation is concerned, as that of the famous trans-Atlantic flyer. In spelling it lacks the letter "H."

Through the liberal use of accessories, the audience was given the representation of the roars of airplane motors, which were produced by turning electric fans into the microphones. For ordinary cruising the fan was turned only part way on. For racing the mo-

tor while warming up or at the take-off, a full blast of the fan did the work.

The lessons were in dialogue form and began with the repartee that resulted upon Gene's arrival at the field. The first was a simple explanation of the controls and the various parts of the ship. Gene asks some pointed though humorous questions regarding the qualifications for good pilots, which Clevenger answers and in doing so indirectly assures every listener that almost any person can learn to fly.

In a subsequent lesson Gene asks "When a fellow like me puts up his hard cash for flying lessons, he wonders when the investment will pay dividends. Do you think I'll make my first five hundred thousand by 1930."

This gave Clevenger an opportunity to explain that there is a demand for salesmen with flying ability as well as a demand for good pilots. This should have aroused interest among the radio fans who were seeking financial opportunity should have and created in them a desire to get into the game.

As an illustration of the humorous touches, note this bit of dialogue:

"GENE—Clev, this air feels awful thin to me, today. Are you sure there aren't any holes in it?"

"CLEV—Nope, no holes. An Eagle-rock just came in with a fresh load of air from sea-level. I patched all the holes myself."

Illustrating how some of the points may be presented through the medium of dialogue, mixed with a little humor, note the following which took place, supposedly, when the duet were preparing to go up and were starting the engine:

"CLEV—Don't say 'ON;' say 'CONTACT.'

(Sound of motor.)

"CLEV—Hold the stick back, now, and give it the gun. There are blocks in front of the wheels."

"GENE—Then I can't shoot anywhere?"

"CLEV—Nope."

"GENE—Why give it the gun, then? * * *"

"CLEV—You're green, all right! Always remember this. The minute your propeller speeds up, it naturally tries to pull the ship ahead. It can't go ahead with blocks under the wheels, so it tries to stand on its nose. With the stick held back the propeller blast presses on top of the flippers and holds the tail down."

(Blocks are removed and the ship taxis off.)

"GENE—Hey, Clev. This thing wobbles all over the field! What you got in the radiator, alcohol?"

(After much additional repartee they start down the field with Clevenger issuing instructions, among which are:

"CLEV—Use the ailerons to keep your wings absolutely level."

"GENE—Aha! Go straight and always be on the level! You can't cheat in these things!"

"CLEV—If you get the impression your right wing is low, move the stick to the left enough to bring it up immediately. Now, for the elevators. When you're on the ground, your nose is way above the horizon."

"GENE—I can't help my nose. I was born with it."

"CLEV—Cut out the horse play. Hold the stick forward now, at the start of the takeoff, until the nose comes down almost to the horizon, then return the stick to an approximate neutral."

(They are in the air.)

"GENE—Wow! Something's gone fooey. Wat the——?"

"CLEV—Gene, I'm ashamed of you. I thought I taught you not to skid."

"GENE—So that's what I was doing? You ought to have tire chains on these babies."

"CLEV—There's no mud or soft sand in the air, Gene. It's all in your head. You're in too big a hurry to get your nose around the horizon. Take it easy. You're putting too much inside rudder on your turns. Now! Straighten her out and fly south."

"GENE—South, South! Lord, man, which way is South? Think I'm a duck?"

In one lesson Gene is taught the principles of stalled flight, which Clevenger explains is necessary to know how to prevent getting into accidental tail spins. He explains that Gene probably will go into a spin and Gene promptly has a heavy feeling in his stomach and declares he feels pale. However, the tail spin is made, corrected, and everything ends with a good landing.

In the lesson on looping, Gene has some thrills that are humorous yet dangerous. Clevenger speaks at length on the need of watching the horizon, keeping the wings level and pulling the nose up to the horizon when the loop is completed, to which Gene remarks that "You sure keep your nose on the horizon a lot in this flying business." In reference to keeping the plane straight in a side drift wind, Gene remarks, "Funny things, these planes. Steer 'em straight and they go so crooked you've got to steer crooked to go straight."

The lessons were based upon Clevengers' book, "Modern Flight." All through the dialogue, where appropri-

(*Continued on page* 81)

Nose Down—Three feet off—Sitting Pretty.

The Eastbay public will obs..ve
Air Mail Week
January 22-28
To Learn the real value of Air Mail
To promote the cause of Aviation
To encourage the Oakland Airport
he principal air
THE PROPER WAY TO OBSERVE Air Mail Week
is to use the Air Mail for all your communications

Air Mail Week

By Blaine Stubblefield
Boeing Air Transport, Inc.

Organizations in cities on air mail routes can follow the example of Oakland with good results. The rapid increase of the use of air mail will result in more practical aid to aviation as a business than a government subsidy.

"USE Air Mail During Air Mail Week!" But there's a string tied to that. If they use air mail a week they never stop. How to get people to use the air mail service, not only for a week, but indefinitely, has just been demonstrated by Boeing Air Transport with an Air Mail Week in Oakland, California.

Air mail traffic departments, and cities and towns interested in making their public "air minded," will be interested in a brief outline of the Boeing company's air mail week program. C. R. Borkland, POPULAR AVIATION'S advertising manager, hopped over to the Bay Cities on the Boeing line, and arrived in time to see the wind-up of the proceedings, particularly the records of results achieved.

The completeness with which the campaign centralized the willing efforts of civic and social clubs, newspapers, radio stations, chamber of commerce, business houses, schools, hotels, restaurants, and all citizens was quite unusual. The proceedings were outlined beforehand, and the entire city seemed to work as one unit for one purpose.

First on the program was a proclamation by the Mayor, setting forth the value of the air mail service to the public, and the value of the airlines to the city. This all the papers published. Then followed a resolution by the Chamber of Commerce, adopting practically the premises of the Mayor's proclamation.

A speakers' program was arranged, enlisting the services of every person in the community well known in aviation circles, and the entire staff of the traffic departments of both Pacific Air Transport and Boeing Air Transport were conscripted as orators. Arrangements were made with practically every social and business organization in the city to furnish speakers for regular or special meetings during the week, and about twenty-five speeches were actually made. All of these talks dealt with what has come to be called "the four points" of the new air mail regulations: i.e., that air mail goes anywhere for ten cents each half ounce, any postage, air mail stamps not necessary; that air mail envelopes are not necessary, any plain envelopes may be used; that air mail in plain envelopes must be plainly marked, "Via Air Mail;" that air mail may be dropped in any mail box or letter chute.

The "four points" was the theme of all speaking and advertising during the week. It is believed by all those in-

terested in air mail, that the biggest problem before the air mail service is to disseminate among the people these few simple facts: to teach them that there are no longer any complicated zone systems and special rates to contend with.

Fortunately, Oakland Air Mail Week could be tied up with the formal opening of the new Oakland Municipal Airport, which had recently been designated by the Post Office Department as the Western operating terminus of the Transcontinental route. Facts regarding the airport and the operation of the air mail line offered a supply of interesting themes upon which publicity stories were written for all the daily papers each day. The "four points" were generously spread among the stories, in such a way that they did not spoil the "readability" of the news.

Cooperating in the airport publicity was the Board of Port Commissioners, who were largely responsible for the building of the airport, and who were, of course, interested in the rapid development of traffic for all airlines. The officers of the Port Commission gave their valuable assistance in making contacts with the leading business men and city officials.

The Chamber of Commerce offered the services of its Airport Committee, and the publicity department furnished mailing lists, and space in its official publication, the *Oakland Outlook*. In addition to this, it sent out form letters to several clubs and societies, explaining air mail week, urging special air mail programs, and the use of air mail. A leading feature among the publicity department's activities was a two-page printed letter, showing pictures and some good copy on the attractions of Oakland. These letters were distributed in bulk to various organizations, who in turn distributed them among their members to be sent out to distant friends by air mail. The letters, of course, carried announcements about Air Mail Week and Oakland's position on the air way map. The Chamber of Commerce also gave over one of its offices for the use of the workers.

Three of the leading radio stations agreed to cooperate, and were given a series of written announcements of about 25 to 50 words each, to be read on the air each day. All restaurants allowed the slogan, "Use Air Mail" to be printed on their menus during the seven days period. Hotels placed "four point" cards in their lobbies, and air mail stationery in guest room desks. Their managers also agreed to see that all air mail arriving for guests was handled with the same dispatch that telegrams are handled. The Key System Transit company placed hangers in the windows of all their street cars and trains. These were printed for them. Advertisers ran air mail epigrams in with their usual display copy.

Among the most able assistants in the campaign was the Post Office itself, under the direction of Postmaster John F. Conners. Air mail stickers were placed on all mail boxes and letter chutes; large "four point" cards were posted on the sides of the mail boxes; the Postmaster gave out statements to the newspapers.

Most prominently in evidence of all the air mail week features were the beautiful air mail display windows contributed by about a dozen of the leading department and other large stores. Materials on display in these windows consisted of propellers, engines, instruments, enlarged pictures, show cards, the "four point" cards, maps showing the routes, models, air mail stationery, and flying equipment, most of which was furnished by the transport operations departments.

It was hardly possible for any person at all active about the city to avoid seeing something about air mail week, and so interesting were the various appeals for attention, that most of the public learned the full set of instructions for using the service. Following is quoted daily air mail piece reports by the local Post Office, showing the change brought about as a result of Air Mail Week:

Air Mail Week was brought to a fitting close with open house day at the airport, Sunday, January 29. An invitation to the public to visit Oakland's new airport had been appended to all the air mail propaganda, and results were amazing. At 10 o'clock Sunday morning crowds began to assemble, and by noon a continuous line of automobiles blocked the highways for two miles. All day long, people poured through the hangars and the administration building. About 4,000 persons waited in line and climbed over the stair-stepped platform that had been built to give them a view of the Boeing mail plane cock-pit, cabin, and mail compartment. It was dark when the doors were closed and the last of the visitors departed.

On page 79 will be found a tabulation of the air mail business as reported by the Oakland Postoffice, together with a comparison of the business of the preceding month. Naturally the mailings at Christmas time were unusually high, but the increase shown during Air Mail Week shows what can be accomplished by concerted effort.

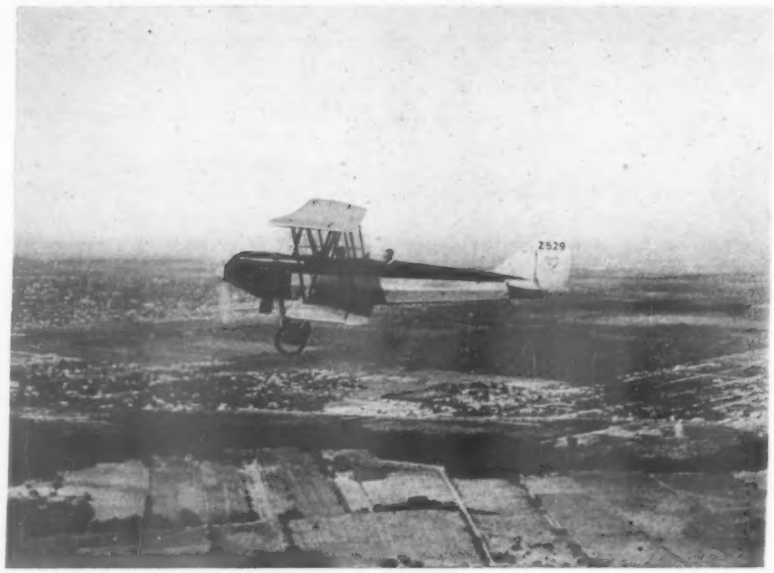
(Turn to page 79)

Beautiful scale model Boeing used for display during Air Mail Week at Oakland.

Model of one of the 24 planes of the Boeing Air Transport Inc., carrying mail, express and passengers between Chicago and San Francisco.

Forming a Flying Club

By R. E. Ashbaugh
Alexander Aircraft Company



Many requests have come in from enthusiasts who are eager to start a flying club. Here is an article showing how one club was organized, financed and successfully operated.

A SUBJECT close to the hearts of the airminded in every community is that of starting a flying club.

When the amount of capital necessary to purchase ships, flying field, hangar and club house is computed the pep temperature of would-be organizers often slides below the zero mark.

Weak hearts never attain the heights of their desires. Able management is the only weapon necessary in any average community to place a flying club on "velvet." Believe me.

It has been the author's pleasure to visit an outstanding example of one of these newly organized, going and growing flying clubs. Let me introduce the Pikes Peak Flying Club of Colorado Springs and Robert Rhea its able president.

Rhea can tell you in his own words much better than can I just how his outfit was pulled out of the "red."

"Last summer several of the young business men in the town were discussing aeronautics with me and expressed a desire to learn to fly. I told them that it could be easily arranged and they asked me to work out a plan. After considerable thought and investigation I called a public meeting at the Chamber of Commerce of everyone in the region interested in learning to fly or who already knew how to fly, but prior to the meeting I had located ten men who had put up $250.00 each to pay for a course in instruction.

"At our first meeting I proposed that we organize a nondividend corporation in the name of The Pikes Peak Flying Club. The by-laws prohibited salaries or reward to officers or directors and the services for keeping the books and general management were to be given by various ones of us gratis in the interests of aviation. I proposed that we buy an Eaglerock ship, get a permit from the city to use the municipal field, and that we employ a competent pilot-instructor and mechanic. I proposed that each man who was enrolled in the school should undertake to get out on the street and canvass the town and sell flight tickets at $5.00 each. The decision of the majority of those attending the meeting was that a committee of three with myself as one, be applied to complete the legal work, buy a plane, employ field personnel, investigate rates and establish ours, order printing and supervise our ticket selling campaign.

"A week later, or about the middle of September, we were ready to go and on the 20th of September commenced actual flying operations.

"We purchased an Eaglerock ship and employed Earl Zimmerman as Pilot-Instructor. He brought with him an enviable record as an army instructor, since the war having been Flight Commander of a National Guard Unit and during all this flying has had no accident. We employed John Freeman as Rigger Mechanic. We established the following rates: Twenty-five dual instruction lessons of 25 minutes each, $250.00; thirty solo tickets, good for twenty minutes work each, $150.00; hop tickets $5.00.

"Appointments on dual instruction work were made just as you would make them with a dentist and we started off with sixteen fully paid up students. Our plan was to give dual instruction work right of way in the morning and hop business right of way in the afternoon.

"A bond of $1,500.00 was required for solo work and $250.00 on dual instruction work against breakage due to carelessness or misuse of equipment and the amount of any claim against a student was to be fixed by an appraisal committee consisting of three men familiar with airplanes and flying.

"Solo work was permitted only with Captain Zimmerman's approval, and the only ones eligible to purchase solo courses are those who have graduated from his dual instruction classes or transport pilots or pilots with past or present airplane pilots' ratings in the U. S. Army or Navy Air Service.

"During the first two months of our operation student work and hop tickets grossed $9,000.00. I shall not attempt to go into details as to our financial arrangements, as those would vary with the locality; however, I may say that from analyzing our rate schedule you will see that each ticket had a

gross value of $5.00 and Captain Zimmerman was paid $1.25 for each ticket taken up from any source and our mechanic was paid 35 cents per ticket. All purchases of supplies passed through the hands of one of our young business men in town. I kept the books and another one of us acted as field officer. Before we had been operating four weeks we added to our equipment another Eaglerock plane, one extra engine, a liberal supply of parts, built a small office-club house and after fourteen weeks operation owe only $1,600.00 (borrowed on a note which ten of us endorsed) and we own around $7,000.00 worth of equipment and buildings. You can see that very shortly the enterprise should be entirely self supporting and free of debt.

"We have flown through all the cold weather to date with only a few interruptions.

"I estimate that in less than four months our ships have flown in excess of 50,000 miles and we have never had a landing outside of our own field and no breakage of any kind, except the replacement of one landing gear and a few wheels, and these did not collapse in service but were removed as a precaution against trouble.

"We do not allow our ships to be taken out of our training area, which is over safe ground always, but we do give each student a cross country flight of forty-five miles to Pueblo.

"Our success with Eaglerock ships has been excellent. In November, fourteen of our students safely passed their flying and mental examinations for Department of Commerce private licenses and a fresh crop of students are rapidly nearing their solo day.

"Interest became so acute in our town that Thanksgiving an aviation ball was given at the Broadmoor Hotel which netted the club a handsome sum and was the best social affair of the season. The use of the hotel was donated by the management."

And so ends a story that should inject the do and dare into the hearts of those sitting on the fence, due to weak hearts.

A flying club is one of the simplest and least expensive ways for the air-minded in any community to obtain the joy of flying. Bob Rhea and his Pikes Peak outfit count just one in the growing list of flying clubs but his plan is among the best that I have seen.

Earl Zimmerman, pilot-instructor for Pikes Peak Flying Club, Colorado Springs, Colo.

Airplane Registration Marks

A LARGE number of people are no doubt confused by the present system of international identification markings. For example, if an airplane came from Europe, bearing the capitals G-ILOV on its wings, the meaning of these letters would certainly be mis-interpreted by those ignorant of their intent.

To the understanding ones, however, G signifies that the airplane is from England and ILOV are the owners personal identification marks. (Refer to table.)

All types of aircraft, whether airplanes, airships or balloons, are required to carry these registration letters if they fly outside a three mile radius from their airport. The only classes exempt from the international agreement are military and naval aircraft, or aircraft of nations who do not subscribe to the Aerial Navigation act.

In view of the fact that varying sizes and shapes of aircraft exist, no fixed size for these markings is required by the International agreement. They must, however, be in large and uniform, easily discernible capitals. The width of each letter must be 2/3 of its height, and the thickness of a single stroke must be equal to 1/6 of the letter. Also, a dash equivalent to the width of a letter separates the first letter, denoting nationality, from the owners' registration letters.

On airplanes the marks are carried on the upper and lower surfaces of the wings, and on the fuselage, reading from left to right. The nationality letter must also be carried on the rudder. On airships and balloons it is a comparatively easy matter to place these letters on the gas envelope, while on types of aircraft that have no recognized fuselage, the markings are carried on the gondola.

These markings may be compared to a license on an automobile. Once a craft has been registered and the registration letters issued, it is officially known only by these letters, regardless of its owners' whims to rechristen it with a pet name (or vice versa, if it refuses to function properly). Also, when sending or receiving messages by radio, use must be made of these registration letters, except for communication where Morse code is not used. They are also utilized for identification purposes even when telephony is employed.

It can easily be seen by referring to the table, that a wide range of combinations are rendered possible by the 26 letters of the alphabet. Many years will probably elapse before a new system of identification is needed.

TABLE OF INTERNATIONAL MARKINGS

Country	Nat. Letter	First Identification Letter
United States	N	Any combination with 1 vowel
Spain	M	"
Great Britain	G	"
France	F	"
Italy	I	"
Japan	J	"
Abyssinia	A	B
Hejaz	A	H
Nicaragua	A	N
Albania	B	A
Bulgaria	B	B
Chile	B	C
Lettonia	B	L
Bolivia	C	B
Cuba	C	C
Switzerland	C	H
Portgual	C	P
Roumania	C	R
Uraguay	C	U
Esthonia	E	A
Ecuador	E	E

Haiti	H	H	Brazil	P	B
Hungary	H	M	Persia	P	I
Holland	H	N	Poland	P	P
Siam	H	S	Argentine	R	A
Costa Rica	K	C	Sweden	S	A
Finland	K	S	Greece	S	G
Czechoslovakia	L	B	Panama	S	P
Guatemala	L	G	Denmark	T	D
Liberia	L	L	China	X	C
Luxemburg	L	U	Honduras	X	H
Monaco	M	O	Serbs and Croats	X	S
Belgium	O	B	Danzig Free State	Y	M
Peru	O	P	Lithuania	Z	L

Collier Trophy Awarded

THE Collier Trophy Committee of the National Aeronautic Association has awarded to Charles L. Lawrance the Collier Trophy for 1927. The Collier Trophy, according to the Deed of Gift, shall be awarded annually by the National Aeronautic Association "for the greatest achievement in aviation in America, the value of which has been demonstrated by actual use during the preceding year."

Mr. Charles L. Lawrance was the pioneer in the development of the air-cooled engine in America. The original model of the present Wright Whirlwind engine was designed by Mr. Lawrance in 1921. His far-sightedness for the future of aviation in this country and his untiring energy in the development of this engine has brought it to its present state of perfection.

The Collier Trophy awarded annually by the National Aeronautic Association for the greatest achievement in aviation demonstrated by actual use.

The outstanding performance of the Wright Whirlwind engine during 1927 embraces many records of national and international interest. The trans-oceanic and other flights made with this engine have resulted in widespread public confidence and interest in aeronautics.

The Collier Trophy Committee is particularly happy to make the award to Mr. Lawrance, not only on account of the inherent merit of his world famous engine, but also on account of the great modesty of the man, who, when some one remarked to Mr. Lawrance that he had received very little credit for the marvelous flights made by "Whirlwind" engined airplanes, quietly replied, "Who ever heard of the name of Paul Revere's horse?"

The Collier Trophy Committee this year consisted of Dr. George W. Lewis, chairman; Mr. Porter Adams, president of the N. A. A.; Mr. Charles J. Bell, Washington, D. C.; Captain Earl N. Findley, Washington, D. C.; Mr. Edgar N. Gott, president, Keystone Aircraft Corporation; Captain Emory S. Land, assistant chief, Bureau of Aeronautics, U. S. N.; Carl F. Schory, secretary, contest committee, N. A. A.; Captain Burdette S. Wright, U. S. Air Corps; and Major Clarence M. Young, director of aeronautics, Department of Commerce.

This trophy was donated in 1910 by the late Robert J. Collier, Esquire, and the previous awards have been as follows:

1911 to Glenn H. Curtiss for hydro-aeroplane development.

1912 to Glenn H. Curtiss for development and demonstration of the flying boat.

1913 to Orville Wright for development and demonstration of his automatic stabilizer.

1914 to Elmer A. Sperry for development and demonstration of gyroscopic control.

1915 to W. Starling Burgess for development and demonstration of Burgess-Dunne hydro-aeroplane.

1916 to Elmer A. Sperry for development and demonstration of Sperry Drift Indicator.

This trophy was not awarded from 1917 to 1920 on account of the war.

1921 to Grover C. Loening for development and demonstration of his aerial yacht.

Charles L. Lawrance, of the Wright Aeronautical Corporation, awarded the Collier Trophy for 1927.

1922 to the personnel of the U. S. Air Mail Service for their wonderful achievement in completing a year's operation along the different routes from Coast to Coast without a single fatal accident.

1923 to pilots and other personnel of the U. S. Air Mail Service for successfully demonstrating to the world the practicability of night flying in commercial transportation.

1924 to the U. S. Army Air Service for having accomplished the first aerial flight around the world.

1925 to S. Albert Reed for the development of a metal airplane propeller.

1926 to Major E. L. Hoffman for his outstanding part in the development of a practical parachute for use in aviation.

The trophy will be awarded to Mr. Lawrence at Washington on a date to be announced later.

"Clarice" Makes a Bow

By L. M. Paxton

THERE'S a rumor that "There goes Clarice" started something the other day at the Naval flying field, when an officer pointed to the sky and a figure came hurling groundward from an airplane. But there was no occasion for alarm, a fair damsel was not plunging to destruction

Clarice looks nearly human from the back.

via the parachute route. Clarice is an aviatrix in the employ of the United States Navy Department, and she has sustained injuries that would prove fatal to ordinary folks. But she is inured to accidents; she is made of rope, and weighs about 180 pounds, because her stomach is stuffed with scrap iron to approximate the weight of a heavy man.

When Clarice makes her spectacular ascents, she dons overalls, and a standard "seat pack" parachute which the Navy uses. When she drops from an airplane, a rip cord is pulled which opens the pack and releases the parachute. Whereupon, as the latter expands umbrella-fashion, Clarice floats slowly and gracefully down.

The Navy is engaged in constant experiments to improve the efficiency of parachutes. Early tests were made with a short railroad tie, secured in overalls similar to those worn by fliers, but Clarice was evolved as the brain child of an officer who afterwards wrote a sonnet to her beauty, which is Navy lore.

Experiments with Clarice have resulted in a new system of parachute jumping. Instead of throwing Clarice off a plane, the parachute was thrown off first, and Clarice was left on a wing of the plane. The parachute pulled Clarice from the wing. The chute which is controlled by a miniature bag emerges on the pulling of a rip cord to which a ring is attached. The pilot parachute opens automatically through the force of rubber springs, and drags the main bag into position and causes it to spread and inflate. By the time the main bag is inflated, the parachute is sufficiently removed from the plane to avoid the possibility of any mishap, the force of its opening dragging the flier a safe distance from the craft.

While the Navy designers were discussing this new type of parachute, the question arose: "Who will be the first to test it?" The unanimous vote was "Clarice!" So, again, Clarice risked her hempen life to further the interests of safe aviation. And when she had demonstrated that the new device worked, James K. Clark, star parachute jumper of the United States Navy, made a subsequent test. After he landed safely, he described his experience:

"The jerk you get when your body is suddenly dragged off the wing of a plane going at a speed of a hundred miles an hour or more, is a bit severe, but it doesn't hurt you. There's no doubt that the new parachute, while an improvement on the old, will not be the last design. There will be newer and better parachutes, and Clarice will always be on the job to make the first trip in them, to find out whether they work or not."

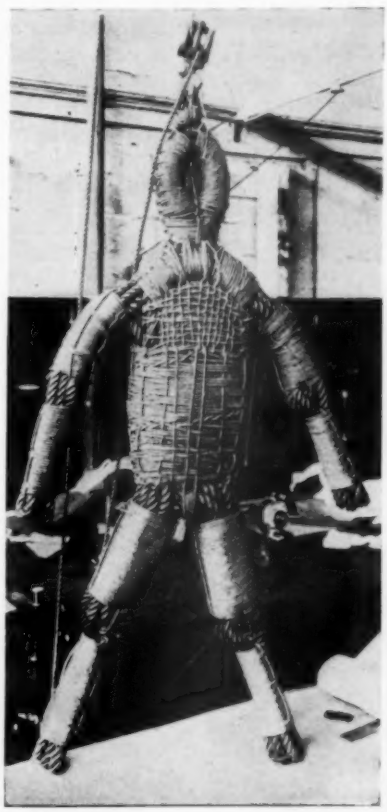
Without her clothes, Clarice is not beautiful, but the humanitarian services which she renders — having dropped from altitudes of one to five miles—entitles this stunt artiste to the homage of aviators of the Navy Department.

New Airway Map

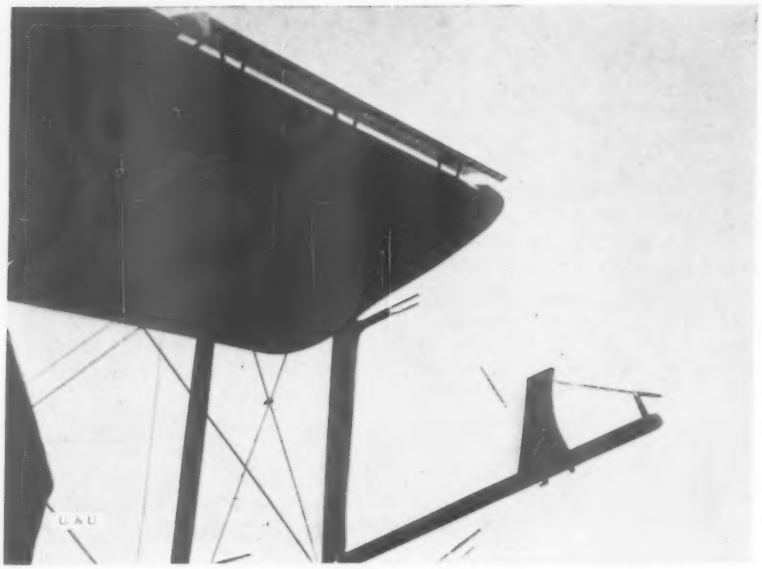
A new airway map showing distances by plane between airports in the United States to serve as a standard in computing air mileage traveled was made public by the Aeronautics Branch of the Department of Commerce today.

The map was sent to all air transportation companies and other plane operators in order to obtain accurate statistical mileage statements in the future, it was stated.

But without her flying togs— she has little appeal.



Slotted Wing for U.S.A.



Automatic slot, with scale showing amount of opening.

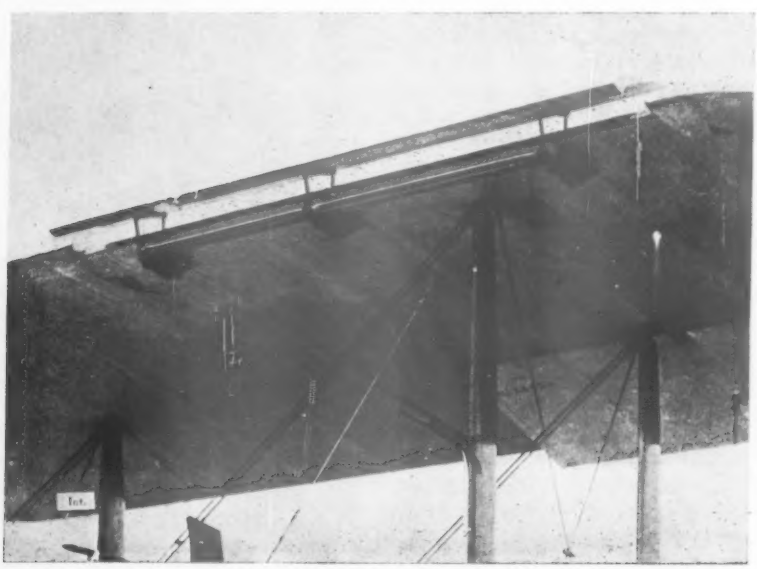
THE "automatic slot," the British device which attaches to the wings of planes and which already has proved its value as a means of enhancing safety in flying by practically eliminating nose dives, stalls and incipient spins, hereafter will be a part of the standard equipment of Army and Navy craft.

The Navy Department, acting officially for the United States, has acquired for this country the patent rights of the automatic slot, owned by the Handley-Page Company, of England. Acquisition of the rights is the result of a contract signed in 1922 whereby the government obtained not only the rights to use the slotted wing but also the developments which may subsequently be made.

Recent tests of the automatic slot conducted in England have established the practicability of the device as finally developed, and the Navy Department is going ahead so as to have both service and training planes equipped with the new safety development.

Both the United States Army and Navy air services will avail themselves of the rights acquired from the Handley-Page Company. Commercial rights in the United States, however, have not been assigned to the Navy Department, although it is understood that commercial planes are to be so equipped.

Handley-Page Automatic Slot fitted to wing of Navy plane.



The most important aspect of the automatic slot, insofar as the Navy is concerned, is that it is particularly adapted and of importance to the types of planes operating from aircraft carriers. Naval aviation experts say that it makes possible a lower take-off speed, a lower landing speed or, if the landing speed now used be retained, a higher top will result from the use of the smaller wing surface made possible.

The automatic slot comprises an auxiliary air foil which, when closed, is part of the nose of the normal air foil or main wing. It is secured to the wing itself in such a maner that, at normal speeds and above, it remains closed but as the speed is reduced beyond a definite point the air forced on the plane pulls the auxiliary air foil forward, thereby opening a slot between this air foil and the main air foil. With the speed again increasing, the slot closes, the action of opening and closing being purely automatic. The effect of the open slot is to increase the lifting capacity of the wing up to large angles and to prevent "burbling" or "eddying," the cause of loss of lift at the usual stalling angle.

At present the automatic slot is confined to the region immediately forward of the ailerons. The complete development will include the slots and flats on the inner portions of the wings.

The National Advisory Committee

for Aeronautics is perfecting methods of the control of airplanes at low speeds which will be just as effective as the Handley-Page slotted wing, a British invention, according to Joseph S. Ames, chairman of the committee. While the Army and Navy have obtained the patent rights for the automatic slot from the Handley-Page Company, and are now equipping their planes with this device, its use is not permitted on commercial planes in the United States.

Pointing out that it is in commercial flying that control of airplanes at low speeds and in making short take-offs is of vital importance, Dr. Ames expressed confidence that this would be accomplished by the equivalent methods developed at the Langley Memorial Aeronautical Laboratory.

"An airplane in climbing too steeply loses its horizontal speed and is liable to fall out of control because the air coming over the edge jumps away from the surface of the wing and you cease to get the lifting force which you otherwise would get," Dr. Ames explained. Anything that will preserve the flow of air over the surface of the wing leaves the airplane under your control and retains the lift. All the Handley-Page slot does is to keep the continuity of flow over the surfaces of the wing so that the air does not break away. It is now made automatic.

"There are other ways to secure this same effect. We are trying them out at Langley Field and they are just as hopeful and possibly more hopeful than this work of Handley-Page. There are two methods by which that is done. One consists in shooting air out from the inside of a hollow wing parallel to the surface, which induces the air flow to come down and stick to the surface of the wing. Air is supplied to the interior of the wing under small pressure. The other method is to suck the air out of the hollow wing."

Mr. Ames explained that these devices work most efficiently on a monoplane. So far the experiments have been made with a biplane but one wing interferes with the other. To carry forward its work on this project this year the National Advisory Committee is planning to purchase a monoplane. The committee's budget, when approved by Congress, will permit the expenditure of $30,000 for this purpose.

Aviation Legislation

LEGISLATION affecting the Government's aviation activities is making speedy progress through Congress. Increased appropriations are being approved from which both commercial and military air service will derive benefit. A new feature of pending legislature is a proposal to use public lands, where available for municipal aviation fields. The adoption of such a policy by Congress, it is declared, would be of great assistance in establishing airports, particularly in western states.

Representative Clyde Kelly's bill to authorize the Post Office Department to arrange with foreign countries for air mail transportation has been unanimously approved by a subcommittee of the House Committee on Post Office and Post Roads. Mr. Kelly's bill proposing a reduction in the air mail postage rate from 10 cents a half ounce to 5 cents an ounce is still under consideration by the committee.

The House has approved appropriations totaling $3,871,850 for commercial aviation during the fiscal year commencing July 1, 1928. The bill provides that $662,000 shall be used for carrying out the provisions of the Air Commerce Act governing the licensing of pilots and planes, etc., and $3,209,850 for providing air navigation facilities. The bill now awaits Senate action and William P. MacCracken, Jr., Assistant Secretary of Commerce for Aviation, appeared before the Senate Committee on Appropriations January 17 to outline the Commerce Department's program for 1928-29, which contemplates the expenditure of $500,000 more this year. The increase is provided for in the bill as it passed the House.

The House Appropriations Committee has favorably reported a supply bill carrying $600,000 for the work of the National Advisory Committee for Aeronautics and the Langley Memorial Aeronautical Laboratory at Langley Field, Va., where much of the Government's scientific research work and tests are carried on. The 1928-29 appropriation is $50,000 larger than that for the current year and the Committee's program for the coming year includes several projects bearing directly on the design and construction of commercial planes.

The House has passed a bill sponsored by Representative W. Frank James, of Michigan, authorizing an appropriation of $4,283,716 for hangars barracks and other facilities at army aviation fields. Of the total, $2,486,000 is for relocating and uniting into one field the Brooks and Kelly fields at San Antonio. Another appropriation bill carries $2,000,000 for these fields which would also be available for the new field. An amendment to the James bill offered by Representative Henry M. Wurzbach of Texas, and approved by the House, would authorize the War Department to accept from San Antonio citizens title to a tract of 2,400 acres, valued at $560,000, as a site for the army's new primary flying school, to cost $700,000.

The House has passed a bill introduced by Representative Fred M. Vinson of Kentucky to create a Government aircraft procurement board composed of the Assistant Secretaries of the War, Navy, Commerce and Post Office Departments in charge of aviation. Representative Vinson has introduced another bill providing that both the Secretary of War and the Secretary of the Navy may purchase abroad or in the United States, with or without competitive bids, aircraft and aircraft designs, parts and accessories for experimental purposes and later contract for procuring equipment of this character if found suitable.

An increase of at least 20 in the number of R. O. T. C. units of the Army Air Corps is proposed in a bill introduced by Senator Hiram Bingham of Connecticut. Senator Joseph T. Robinson of Arkansas and Representative Samuel Dickstein of New York have introduced a bill for creating a promotion list in the Army Air Corps on which officers would be placed according to the length of commissioned service. The bill provides for promotions to the grade of first lieutenant after three years' service, to captain after seven years, to major after 12 years, to lieutenant colonel after 18 years and to colonel after 25 years.

The Senate Committee on Public Lands has favorably reported a bill introduced by Senator Henry F. Ashurst

of Arizona authorizing the Government to lease for 20 years to Yuma county, Ariz., a tract of 640 acres for use as a municipal aviation field at a rental of $1 a year. Affirmative action by the Senate and House on this proposal will establish a precedent that, it is expected, will be followed in other localities.

Senator David A. Reed and Representative John M. Morin of Pennsylvania have sponsored a bill authorizing the War Department, for the purpose of assisting in the development of aeronautics, to loan available aeronautical equipment and material to American aircraft manufacturers and designers or others engaged in research and experimentation.

Little difficulty in the supervision of flying has arisen so far as a result of the divided jurisdiction of the federal and state governments. No clashing of authority between them is expected by the Aeronautical Branch of the Department of Commerce, which is charged with enforcing safety measures in interstate air transportation. Government supervision falls short of complete effectiveness principally because of the apparent inclination of the state authorities for the most part to leave examination of pilots and planes entirely to the federal government rather than set up their own machinery. The result is, it is pointed out, that with limited jurisdiction, the federal government is nevertheless obliged, in the interest of public safety, to undertake regulation of all flying.

Prior to the enactment by Congress of the Air Commerce Act of 1926 only five states, Massachusetts, Connecticut, California, Oregon and Minnesota, had incorporated licensing provisions in state laws. Since then Pennsylvania and Michigan have passed laws providing for licensing, and similar legislation is under consideration in New York and New Jersey.

The state laws generally provide that pilots must hold either a state or federal license. In the first instance, the state does not surrender its jurisdiction entirely. In Pennsylvania, for example, the law provides for a licensing authority in the state, although the state's requirements are identical with those of the federal government.

In Michigan, on the other hand, the law simply makes a blanket provision that to fly in the state, operators must have a federal license. Both forms of state legislation are acceptable to the Aeronautics Branch of the Department of Commerce, according to William P. MacCracken, Jr., Assistant Secretary of Commerce for Aviation. It is in states where there is no existing legislation that the federal government's limited supervision of aviation is causing concern to the department.

When the Air Commerce Act was still in process of enactment, the House undertook to give the federal government the right to examine and require licenses from pilots operating planes within the boundaries of one state, but this was modified when the bill went to the Senate, so that as the federal law stands now it does not confer jurisdiction over commercial air operations within a state.

The Commerce Department is seeking to induce all pilots to obtain federal licenses, and if the courts should uphold the enforcement of a penalty against a pilot holding only a state license it would indicate that the federal government has the right in the interest of public safety to require that all pilots shall apply for federal licenses. Army and Navy now are required to obtain licenses from the Department of Commerce if they wish to fly a commercial plane.

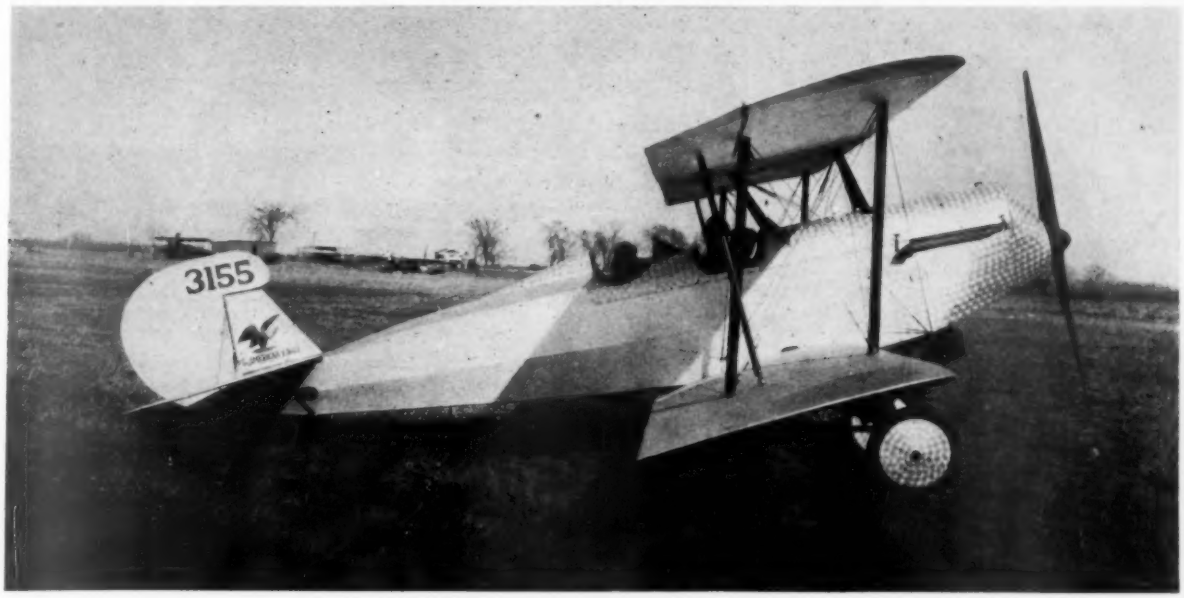
Recognizing that the federal government, lacking complete jurisdiction over all flying, will never be able to assure complete safety in air transportation until it is given adequate authority, sentiment in Congress is growing in support of amendment of the law. Where a pilot confines his operations to one state, there are many federal regulations and air traffic rules which he may violate but for which he is not subject to penalty. Such regulations govern low-flying, either over open country or a thickly inhabited community; and stunt flying over a city, or a gathering of persons anywhere. It is a violation of federal regulations for a pilot to perform stunts while carrying passengers for hire. In connection with landing and taking off the federal regulations require that planes shall land and take off up-wind. A plane landing has the right of way over a plane taking off. The penalty for violation of these regulations and others by a pilot holding a federal license is a fine not exceeding $500, and temporary suspension or revocation of his license.

New National Guard Planes

Air Corps units of the National Guard are to be furnished with a new type of plane in the near future. The above official photo from the Army Air Corps shows the Curtiss 0-11 pursuit plane which will be the standard equipment for the National Guard Air Squadrons.

Note the sweepback and the size of the lower wing. The engine is a Liberty, and the plane seats a pilot and has a machine gunner's cockpit.

Index of American Aircraft



The American Eagle

A three place biplane designed for general commercial flying, transport or pleasure by The American Eagle Aircraft Corporation, Kansas City, Missouri

Specifications

General

Type	Open
Use	Commercial
Length, over all	24 ft.
Height, over all	8 ft. 4 in.
Spread, over all	30 ft.
Chord	62½ in.
Crew	1
Passengers (less pilot)	2
Control	Dual

Power

Make	Curtiss OX
Type	8 cyl.
Rated horsepower	90
R. P. M.	1,400
Cooling	Water

Wing Data

Curve	Aero-Marine 2-A Modified
Sweepback	None
Dihedral, upper wing	None
Dihedral, lower wing	None
Stagger	12 in.
Gap	4 ft. 11 in.
Angle of incidence, upper	2½
Angle of incidence, lower	2½
Spread, upper wing	30 ft.
Spread, lower wing	30 ft.

Areas

Upper wing, including ailerons	160 sq. ft.
Lower wing, including ailerons	140 sq. ft.
Total wing area	300 ft.

Weight

Empty	1,227 lbs.
Fuel, gals.	42
Oil, gals.	4
Pay load	800 lbs.
Gross, ready to fly with load	2,041 variable

Performance

High speed	100 m.p.h.
Cruising speed	85-90 m.p.h.
Climb in first minute	1,000 ft.
Cruising range	5 hrs.
Service ceiling (full load)	14,000 ft.

This page, and the other side, is the fifth of a complete series covering aircraft manufactured in the United States. Every month POPULAR AVIATION will publish the specifications of different aircraft in a standard form, and the entire series will afford you a master reference guide of the types and makes of aircraft in the United States. The selection printed every month is chosen at random by POPULAR AVIATION and no attempt is made to publish the specifications in any order, alphabetical or otherwise.

Index of American Aircraft

Cessna Cantilever-Monoplane

A two-passenger monoplane designed and manufactured by The Cessna Aircraft Company, Wichita, Kansas

Specifications

General

Type	High Wing
Use	Commercial
Length, over all	23 ft. 8½ in.
Height, over all	7 ft. 4 in.
Span, over all	40 ft. ½ in.
Crew	One
Passengers	2, 4-6
Control	Stick

Power

Horsepower	120 to 220
Type	? ? ? ? ??
Cooling	Air

Wing Data

Curve	Cessna
Sweepback	None
Construction	Full-Cantilever
Dihedral	None
Spread	40 ft. ½ in.

Areas

Area of wing	224 sq. ft.
Ailerons	Not Balanced

Weight

Weight, empty	1,250 lbs.
Useful load, with 120 h.p.	500 lbs.
Useful load, with 220 h.p.	1,030 lbs.
Normal weight, fully loaded, with 220 h.p.	2,250 lbs.

Performance

Pounds per sq. ft., loaded	10 lbs.
Cruising speed, approximately	100 m.p.h.
Climb in first minute, loaded, with 220 h.p.	1,400 ft.
Service ceiling, 220 h.p.	18,000 ft.
Cruising range	400 miles
Landing speed at sea level	45 m.p.h.

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The Motor Situation Is Solved

By A. Roe Foyle—Our Own Designer

It is a pleasure to present this solution of a question that seems to occupy the attention of so many people at the present time. The working of this keen, analytical mind and the rapidity with which it grasps and solves the great questions confronting the industry ought to arouse a great deal of interest—or irritation.

TALKING the other day with my consulting engineer I got another wonderful idea. I am not the sort of a person who exaggerates, and I am not one who runs his own ideas down either, and I tell you honestly that this new idea of mine has many of the others beaten forty ways.

George, my consulting engineer, tells me it must be some idea, especially if it beats the others I've had, but then George says a lot of things, and I am inclined to be a little modest. But George's opinion is certainly bound to be pretty nearly right, because he is a technical man. He is the consulting and designing engineer for a large cotter-pin company, and his firm does business with nearly all the aircraft companies and the engine companies, too. That puts George in a position to know all about the aviation game from the technical standpoint. George admits that if it wasn't for his work a lot of pretty expensive machines would go to pieces.

"Why don't you do something about this engine situation?" George said to me.

Now that was the first I had heard about an engine situation, but a trained and active mind is not one to slumber on the job for long, so I determined that if there was an engine situation that I would master it. And I did.

To explain the matter so that you men in the aviation game will understand it the easiest, I will tell you that I have found out through my consulting engineer that the people in the business can't use any old kind of gasoline engine. An airplane needs a special sort of engine, and so many people want these special engines that they can't get them fast enough. You see, as my engineer explained it to me, an aviation engine has to be made with revs, while a regular gas engine has strokes.

Another reason you can't use an automobile engine in a plane is that an auto engine drives wheels in back of the engine, while with an aviation engine the engine has to work a propeller in front of the engine. I suggested to George that we could work out a system for putting in the engine backwards.

"You get most everything that way," said George, "but you can't turn a gas engine around. It would run the wrong way and the propellers are all made the other way."

"Change the propellers," I instantly replied, but George soon killed that idea by informing me that they are all patented to run from up to down, or right to left, and they can't be made any other way.

"You certainly would look funny backing through the air," said George, "I might not be able to keep my face straight, even if I have had a lot of practice."

So that is the engine situation in a nutshell.

However, a little concentrated thought and the application of some of the scientific principles I have acquired and I think I have come pretty close to solving the problem. It means a few radical changes in design, but that won't stop the manufacturers if they once find a good thing. I know that to be a fact, because I have a letter from a well known manufacturer of aircraft and he says in this letter:

"If this idea of yours is any good I'm willing to scrap my whole plant or convert it for making Frigidaires for the Siberian trade."

Well, to get to the point. I have been fooling with models for some time and have got some that will fly.

"Wonderful design," said George, "if you can fly it you ought to look into it further."

So I did, and I did a lot of calculating. I figured out all the weights, the weight of the body and the weight of the motor and the weight of the load I carried. It did carry a load, in fact it wouldn't fly without a couple of pennies fastened to it with a rubber band. I got me some scratch paper and proportioned the whole thing out and found out just how to build the thing right.

That model certainly would fly and when I multiplied it by a hundred times I pretty nearly had a regular plane. And I found out an astonishing thing. The rubber band motor is the most efficient motor there is. When I told George about it he looked at me.

"Twisted," said George.

"Absolutely," I replied, "no good unless twisted, that's how you get the power."

"Twisted," repeated George, "that's how you get that way," and with that cryptic remark he walked off.

Now, this is no joke as I soon proved to George. Rubber motors can be made and they certainly have several advantages. You don't need any gasoline in the first place, so it not only saves money but you don't have any fire hazard except from smoking in the cockpits. Then you never have any ignition trouble because you don't need any ignition. And last of all, you don't have a big heavy engine which means you can carry that much more pay load.

Right down the middle of the bottom side of the fuselage you just run a long tube all the way from the front to the tail. It wants to be big enough to hold the motor with plenty of room besides. At the back end of the tube is a hook to hold the motor. The hook runs through a bearing so it can lock tight and won't move. I fixed it so that by moving a little lever the hook can move. Here is where the really smart part of the scheme comes in. The part of the hook that sticks out is notched like the crankshaft of an automobile where the crank fits on.

All you have to do before going anywhere is to back the plane up to a big electric motor. The shaft of this motor will be notched up like a crank and

when you start the electric motor up you wind up the rubber motor in no time. I made a lot of experiments and calculated you can wind it up just as fast as you can pour gasoline.

Pretty soon all the fields will have these motors and you can buy enough winds for a two hour trip, or a four hour trip, for mighty little money. Then for emergencies you can take along a hand crank.

George said to me, "I knew you could never get away from this crank stuff."

Of course I explained that you took a crank along so you could never get stalled, the way aviators do now when they run out of gas.

"All I have to do," I said, "is to get out the crank and wind it up myself, giving it enough turns to get to the next winding station. Then I put the crank back in the cockpit."

"Both of them?" interrupted George.

"There's only one," I explained patiently.

"I thought there were two," George said.

"I put the crank back in the cockpit," I went on, "and I'm off."

"Absolutely correct so far," conceded George, which is a good deal for a technical man like George to admit.

I did have a little trouble figuring out the braking system, but when I did I found I had invented a pretty good thing for it would not only stop the motor but it would act as a sort of gear. It is very simple, because all it is is a sort of band arrangement that tightens around the pulley wheel that drives the propeller. If you don't pull it too tight the band slips and the motor will run slower, and if you pull it tight the motor will stop.

There's another thing about this invention that makes it pretty good. This long tube the motor is in can be made so that it will form the base of the whole fuselage and it will save a lot of expensive construction. It will be very strong and instead of having a lot of longerons you have only one big one. I proved how strong it was by taking a sheet of paper. Flat, it didn't stand any weight at all without flopping or bending. But when I rolled it up it was certainly strong. That gives you the general idea. Any man with a drawing board ought to be able to work out the rest of it. As George tells me, all I need to do is to get busy with the brain and think these things out and leave the practical application of them to some of the hired help that know how to take orders but haven't any originality.

"You're an original, all right," said George.

Well, I looked up original in the dictionary and found that an original was a genius or man of unique character, and I just thought that while I was at it I would look up genius, and I found that genius is "intellectual power capable of operating independently of tuition and training and marked by extraordinary faculty for original creation and invention."

When I read that to George, his remark was the best compliment I have ever received.

"You certainly operate independently of training and have an extraordinary faculty for invention, and if that doesn't make you a genius then I'm no authority on aircraft."

George did bring up a couple of objections to my rubber motors, but they didn't amount to much. He wanted to know where I would get all the rubber. But I had that all figured out so I had the laugh on my consulting engineer.

"I plan on utilizing all the second hand tires from the automobiles," I replied, with a short laugh, to show him that I considered it amusing for him to think I would forget even a small detail like that. I am thorough, you know.

"I know," said George, "but when they are producing as many aircraft as automobiles, where will you get the rubber?"

"By that time," I replied with dignity, "people won't use autos, but will use airplanes, and there will be that much more new rubber available. Anyway, I can always turn my creative ability toward discovering a substitute if there ever should be a material shortage."

"When I think how we get along with substitutes for everything," said George, "including brains, I believe you could."

Panel Instrument Board

If one reviews the progress of the automobile industry, it will be remembered that in the early days, instruments and accessories were placed haphazardly all over the car.

Later, the instruments were flush mounted in a board or metal dash, and now you will find most automobiles equipped with indirect lighted units panels.

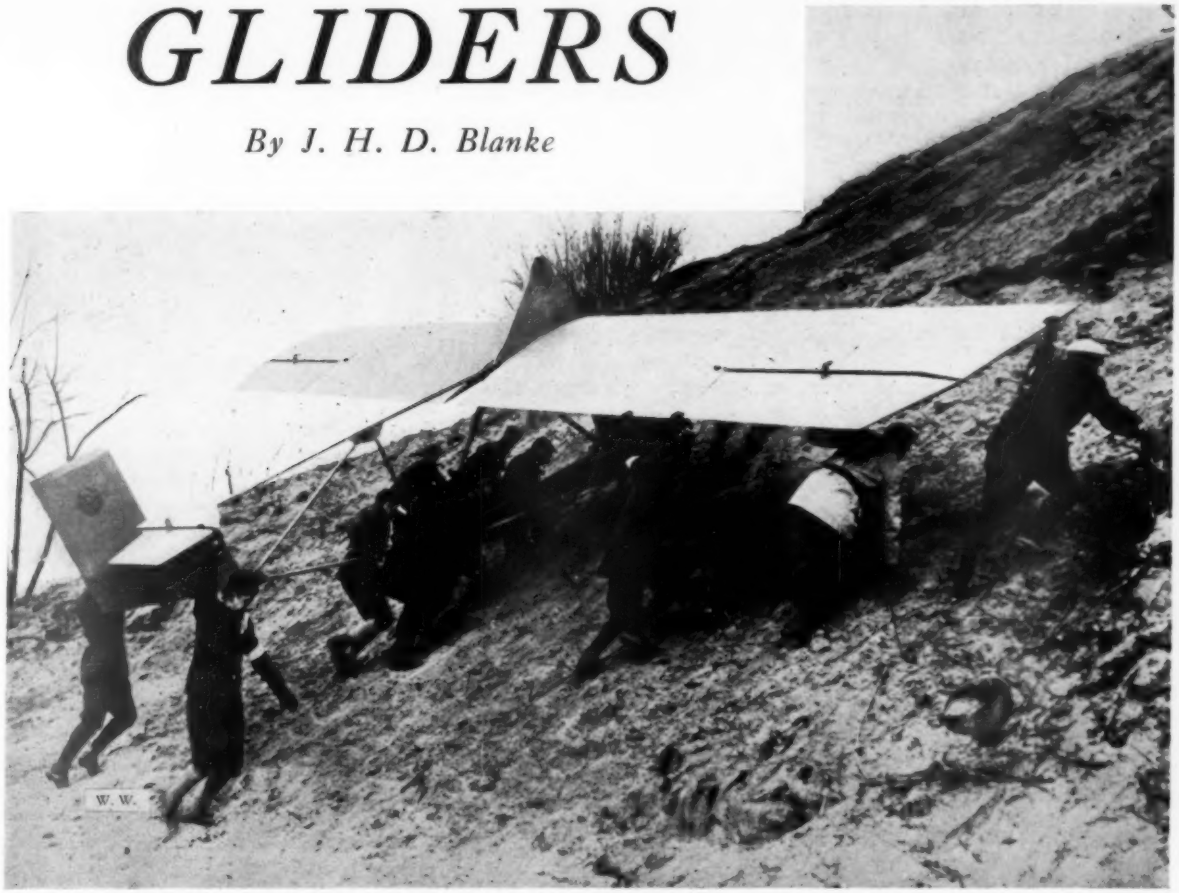
The aircraft industry did not begin quite so crudely as the motor car industry, yet it must be admitted that there is considerable room for improvement in the appointments of modern aircraft. In fact, everything points to a duplication of the improvements made in the automobile.

Anticipating this trend, the Consolidated Instrument Company of America is placing on the market a complete indirect lighted panel, including all the instruments required by the Department of Commerce on the stantype of open plane, namely, an Altimeter, Tachometer, Oil Pressure Gauge and Temperature Gauge.

As shown in the accompanying illustration the new instrument panel is compact, measuring 11½ inches in width and 6½ inches in depth. A 6-volt lamp is used for lighting.

GLIDERS

By J. H. D. Blanke



THE glider offers young men opportunities in developing themselves into pilots of motored planes. Years ago the flyers of gliders were former war aviators and therefore experienced flyers of motored planes. But recently the raw material for gliders is being drawn to and trained in schools, clubs, etc. In Germany the gliders are gaining increasing importance as schooling and practice planes, and really also as performance planes. During the past several years two types of planes have been developed, one for the starting student and the other for practice for the aviators. As shown before, at the Rhoen Glider Contest of 1927 there were represented schooling, practice and performance gliders, most of them being of a design recommended by the Rhoen-Rossitten Association.

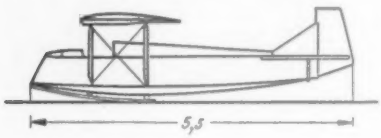
The schooling plane, which is to serve as a start in the training of future flyers, should be constructed at low cost and one should be able to repair it quickly after a possible accident. This type of plane is rather a glider than a sail plane. The aerodynamic qualities are not considered. Engineer W. Huebner writes in *VDI-Zeitschrift* of Dec. 3, 1927, that all schooling planes used at the 1927 Rhoen glider contest were designed like or similar to the recommended design of the Rhoen-Rossitten Association. They were braced hiplanes with a lattice fuselage. The seat of the flyer was frequently located entirely uncovered beneath the plane surface. In many cases all bracing was omitted intentionally from the front of the flyer's seat. The flyer is forced to fly according to his senses, for there is no visible clue as to the position in which his glider is moving. A training course with such a glider is desirable for all those flyers of motored planes who are no longer able to fly their planes without the use of instruments. Furthermore, this arrangement of the flyer's seat reduces the possibilities of injury by wood splinters during an accidental landing.

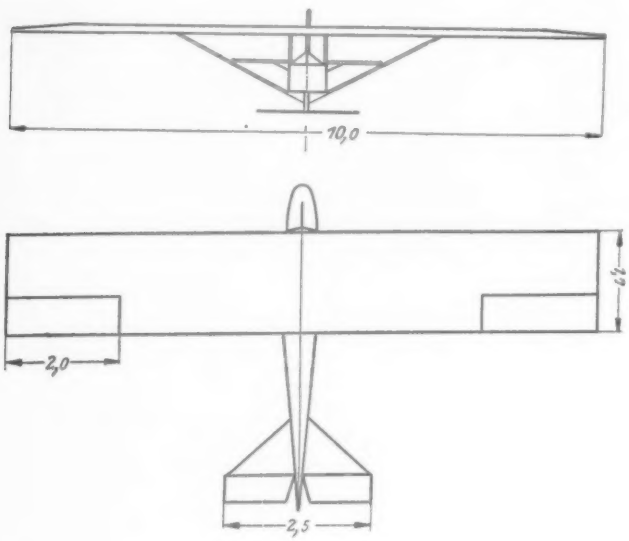
The practice glider is used to permit the student to practice longer flights. Consequently this glider is designed better aerodynamically than the schooling glider. In order to decrease the resistance of the air, a braced type of wing is used in place of the cable bracing, and the open flyer's seat is replaced with a fuselage. Yet, these gliders cannot be considered as being of a high grade aerodynamically, especially since they have a very small span, so as to secure simplicity. This span is only six times of that of the depth of the wing.

In spite of their simple construction the schooling and practice gliders are able to assure good flying records. Expert flyers can cover long distance with the schooling glider even with air velocities of less than 20 feet per second. These two types of gliders are very easily controlled. Due to the square outline of the wings, the danger of a dipped position while flying in curves, etc., is decreased considerably. For the wing ends attain their greatest lift only at a larger angle than that of the center part of the wings. Hence, they impede rotation on the longitudinal axis.

No special models were recommended by the Rhoen-Rossitten Association for the tests with the performance gliders. Here there was a great variety of

models, including the "Margarethe" double seater. All models except one which could be used as a bi-plane, were hi-planes with braced or unbraced wings. The "Oberschlesien" and the "Darmstadt" represent the best in aerodynamic glider construction. The





"Oberschlesien" has a span 20 times greater than the depth of the wings and this is probably the limit to which it can be used. A comparatively young flyer handled this glider well. The "Darmstadt" is an example in design and construction. Its actual weight is only 330 pounds.

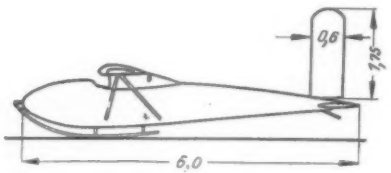
The technical division of the glider contest was noted especially by the appearance of the "La Pruvo" glider of Kirchner, and the "Zaunkoenig" glider of Nihm. The "La Pruvo" glider has an actual weight of only 77 pounds, and a flying weight of 220 pounds. Such small gliders are important in gliding, for there are many warm air currents of small size as for instance under the Cumulus clouds, and these occur also on level grounds. An ascent beneath the Cumulus cloud with a following glide to the next cloud permits longer distance flights even at a distance from the up-moving currents of the mountains. Such limited up-moving or ascending currents, can be used, however, only with planes of small dimension as the "La Pruvo."

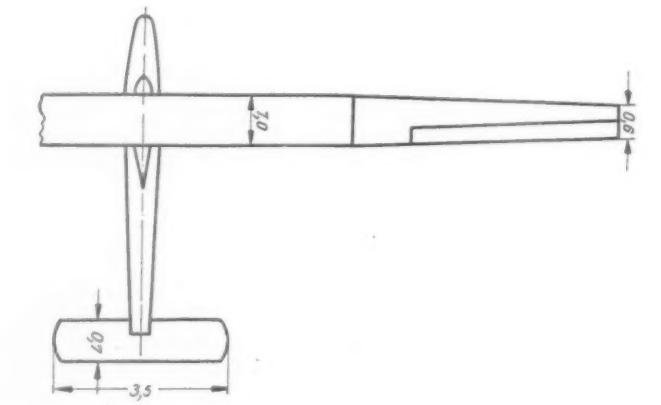
In the "Zaunkoenig" glider the wing profiles of symmetrical design have been applied for the first time to the carrying surfaces of a manned glider. Symmetrical wing sections have the characteristic that the pressure of the air forces does not move about as in an arched wing section; it does not move near the front edge in normal flying range at all starting angles in 25 per cent of the wing depth. Symmetrical wings are therefore also stable in longitudinal direction without the use of controls if the center of gravity is low These wings can be used for the tailless type of plane. Since the pressure medium does not travel about, no distortion forces are caused in the carrying frame work, which can consequently be of a lighter construction.

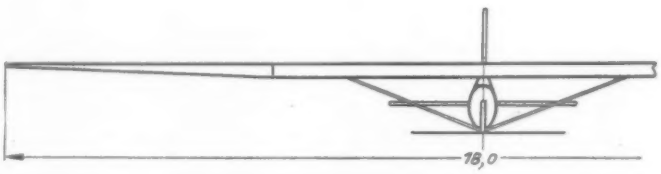
The disadvantage of the symmetrical profile is the small maximum rising force, which is 20 per cent less than that of well arched wing sections. This disadvantage decreases with increase in wing depth and flying speed. Nihm provided it still with a short fuselage and with altitude control; there are still some distortion forces in the wings, since the transversal control is effected by means of adjustable boards. In spite of this the actual weight of the "Zaunkoenig" glider is only 99 pounds. This weight can be reduced considerably more by utilizing to their fullest extent the advantages of the symmetrical wing section. The idea of symmetrical wings originated with the Rhoen-Rossitten Association, which had conducted successful tests with models of this type.

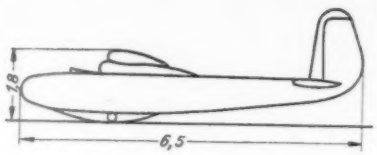
Side control is effected by means of controls located on the upper side of both wing ends; they turn on a vertical axis as shown in the illustration. If the left board is moved outward, the glider

Figure 1 (above). Practice gilder.
Figure 2 (at the right). "Oberschlesien."









turns to the left due to the increase in resistance on this side. If both boards are turned outward sharply and uniformly so that the extensions of their centerlines cross in front of the plane, stability is increased around the vertical axis. If both boards are set at an angle of 90 degrees, there is a strong symmetrical increase in resistance which helps to shorten the starting distance of the glider. The boards are operated by means of foot pedals. This control has proved very satisfactory. It has been tested by the Rhoen-Rossitten Association for some time and also on their glider "Ente."

Mr. A. Proell and Mr. W. Huebner have herewith afforded us an insight into the activities of the Rhoen-Rossitten Association and of the outstanding German glider flyers and their gliders. This material has been presented to show the readers of this magazine what progress other countries have made in the great sport of gliding and sailplaning.

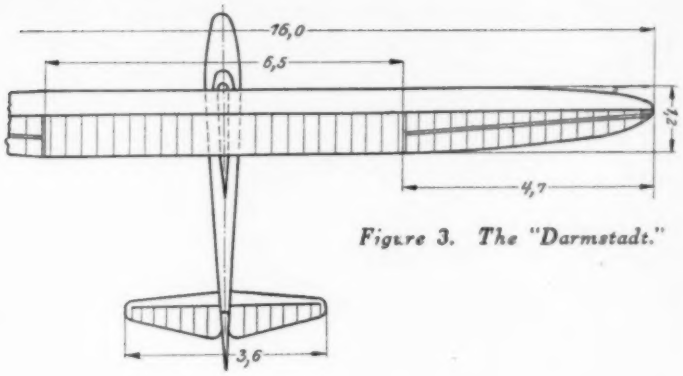
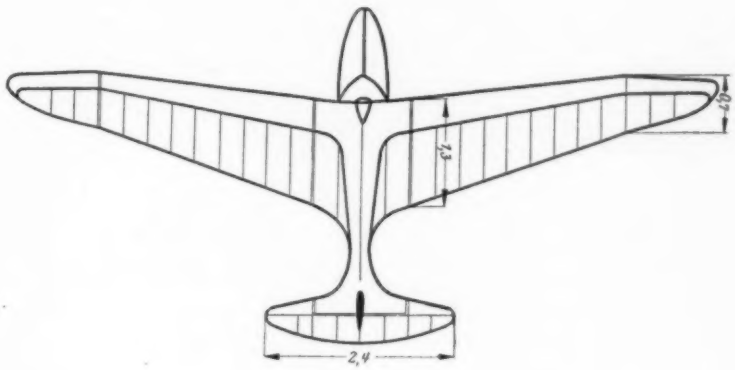
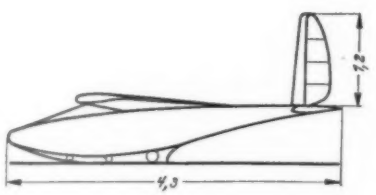


Figure 3. The "Darmstadt."

Firgure 4 (below). "La Pruvo."





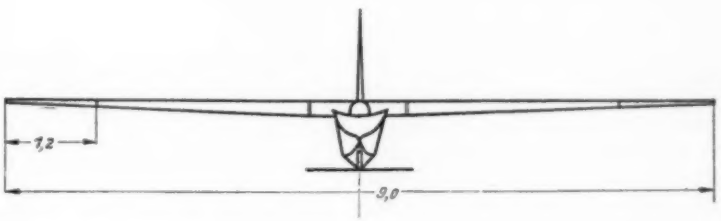
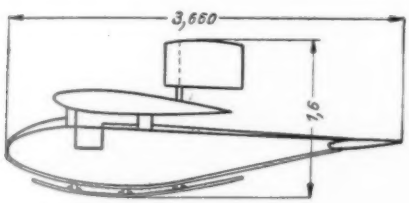
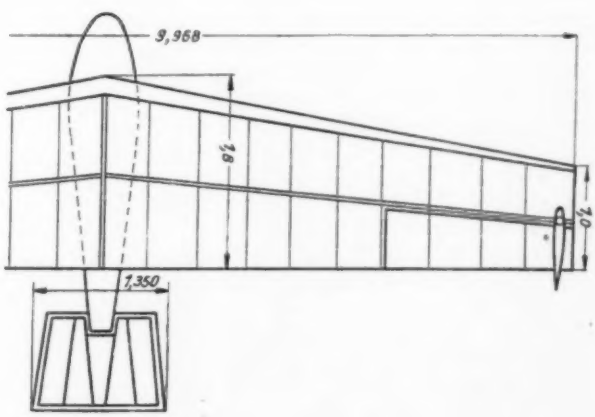
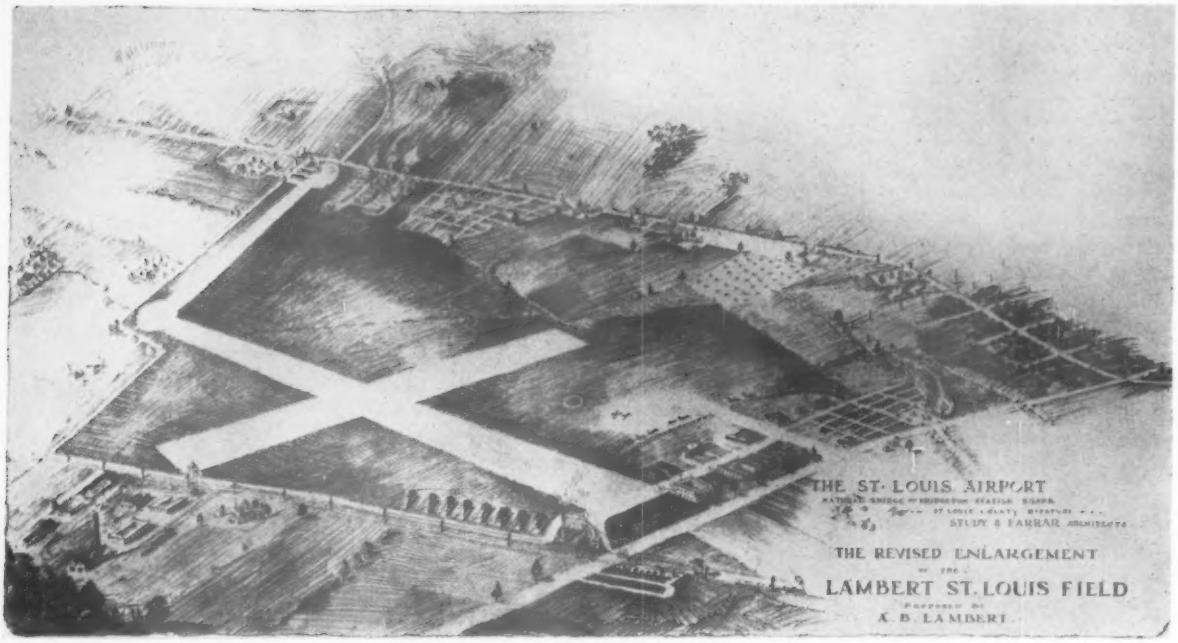


Figure 5 (below). "Zaunkoenig."







St. Louis Seeks First Place

By Thomas W. Parry, Jr.

AVIATION enthusiasts of the Mississippi River metropolis believe St. Louis, the home of Col. Charles A. Lindbergh, will become the aviation center of the United States. The fact that two large airplane manufacturing companies have recently decided to build factories in the Missouri city seems some justification of their belief. One of these—the B. F. Mahoney Aircraft Company, makers of "The Spirit of St. Louis"—will make St. Louis its headquarters, while the Curtiss-Robertson Corporation has started work on a factory in that city.

Even the most ardent enthusiasts, however, agree that St. Louis' future as the aviation center of the country will be decided at the general election next November, when voters will be asked to approve a bond issue of one million dollars for the purpose of building and maintaining a municipal airport that will enable St. Louis to outstrip competing cities.

A flying field such as the one proposed if the bond issue is approved would be comparable to Croyden at London, to Tempelhof Field at Berlin and to Le Bourget at Paris. After St. Louis provides such an airport there is little doubt in the minds of its citizens where the leading aviation industries of the country will locate.

Major Albert Bond Lambert, the dean of St. Louis aviators, and one of the backers of Colonel Lindbergh, first proposed the airport as the most fitting memorial to the aviator who spanned the Atlantic. Mayor Victor J. Miller since has voiced his approval of the idea, and it was he and Comptroller Louis Nolte who first suggested the field purchase be financed by bond issue.

Major Lambert's plan for expansion and equipment of Lambert-St. Louis Flying Field calls for the purchase of 608 acres, of which 170 acres, forming the present field, and 76 acres to its immediate north, are owned by Major Lambert. Incidentally, he has offered that land to the city—and to the city alone—at less than half its value. Options on the remaining ground for purchase at reasonable prices, averaging about $1,000 an acre, have been obtained by Major Lambert on his own initiative. The field as proposed would front 3,800 and 2,600 feet on two streets and 4,000 feet on a railroad. With such a field as a nucleus, Major Lambert believes, St. Louis may expect to build up an industrial district in the vicinity of the field with aviation as its principal activity.

Frontage along the railroad tracks provides quite adequate switching facilities and offers the possibility of delivery of freight to and from the hangar doors of the companies which will operate there. As for the field itself, it will provide an excellent testing ground for planes of any size. It is situated so as to be easily equipped with an adequate water supply. Low price of land within a radius of five miles affords the prospect of adequate housing facilities for workmen employed in the aviation enterprises.

Long runways radiating in all directions and the installation of boundary and flood lights, to insure safe landing at night, are comparatively minor developments of the field proper if the bond issue funds are available.

In addition, the funds will provide for grading and draining the tract, as well as for the purchase of the ground. The bond issue would also provide for erection of an administration building housing the offices of the field manager and his assistants; a meteorological sta-

tion, a first aid station and other necessary auxiliaries. Another detail of the plan will facilitate more rapid handling of air mail, as the loading station would be placed in the southeast section of the field, three miles closer to the city limits. The field would be accessible by hard roads and street car.

Almost half the area of Forest Park, which embraces 1381 acres, the proposed field might easily be converted into an outer park for the city if the advance of aviation ever made it necessary to discontinue its use as an airport, thus protecting the city's investment by the actual value of the property itself.

"The possibility that the field ever would be abandoned as an airport is most remote," Major Lambert said, "but I have provided for that contingency in my plan. It will be noted, for instance, that the runways have been so laid out as to be available for use as streets if it ever became necessary to make a park of the field.

"Aviation will be attracted to the cities which first give it the best accommodations," Major Lambert said in making his initial proposal. "Once a certain locality is entrenched as a leader in the flying industry, nothing will dislodge it, just as nothing could shake Detroit from its position as leader in the automotive industry.

"Beyond the fact that St. Louis is the home of Lindbergh and the backers of the feat that made him famous, it should drive forward to aviation leadership because it is more ideally situated than any city in the United States to become the hub of the flying industry. Its location makes it the logical center for mail, freight and passenger lines to every section of the country. If it provides facilities for aviation the flying business will recognize it as holding that position just as the railroad business has done.

"Furthermore, the same central location makes it ideal for the manufacture of airplanes, since shipments can be made easily to any part of the country and exports of planes and parts can be encouraged by low rates available on the Mississippi River barge service."

Soon after Major Lambert presented his plan, Mayor Miller acted to provide St. Louis with a first-class flying field. He appointed the Municipal Airport Plan and Scope Committee, charged with the responsibility of working out a plan for a representative airport.

After deciding that the bond issue election should be held along with the general election next November, the committee set out to provide St. Louis with an airport to serve as a makeshift until after the election. To that end a bill recently has been passed by the Board of Aldermen calling for temporary acquisition of the present field —Lambert-St. Louis Flying Field—a short distance from the city limits. The bill carries an appropriation of $50,000. Of this amount, $10,000 is to be paid Major Lambert for 18 months' rental of the 76 acres adjoining the present flying field.

Major Lambert purchased the tract a short time ago for $76,000 cash and has promised to sell it to the city for the same price as soon as the city's bond issue funds are available. In event of such a sale the $10,000 paid him for rent would go as first payment on the property.

Major Albert Bond Lambert, dean of aviation in St. Louis.

The present field—170 acres—is also owned by Major Lambert, who has agreed to rent it to the city for $1 a year and promised to sell it for $60,000, less than half its market value, when the bond issue funds become available.

St. Louisans are confident the bond issue will carry. To cover the contingency that would arise should the voters defeat it, however, Major Lambert has agreed to rent the field to the city for an additional three years. The rent would be $1 a year, the object of the arrangement being to give the city another opportunity to pass the $1,000,000 bond issue, if necessary.

The acquisition of two leading airplane factories by St. Louis recently is regarded as recognition of the city's desirability as an aviation center. In moving its plant from San Diego, Calif., to St. Louis, the B. F. Mahoney Aircraft Company will organize a Missouri corporation capitalized at $500,000. Phil DeC. Ball, owner of the St. Louis Browns, and Harry H. Knight and Harold M. Bixby, backers of Lindbergh, will be officers in the new corporation, with B. F. Mahoney continuing as president. The first unit of the factory will cost $50,000 and will be ready for operation by spring. It is to be located adjacent to Lambert-St. Louis Field.

Establishment of the Curtiss-Robertson Aircraft Corporation as a subsidiary of the Curtiss Airplane and Motor Company was announced recently. Major William B. Robertson, president of the Robertson Aircraft Corporation, and one of Lindbergh's backers on his trans-Atlantic flight, is expected to be president of the new company, and C. M. Keyes, president of the Curtiss Airplane Company, is slated for vice president. Bixby and Knight will be directors. The factory will be located at Lambert-St. Louis Field and will have a capacity for turning out more than 300 planes a year with a total value of $1,000,000.

It was at Lambert-St. Louis Flying Field that Slim Lindbergh, before he made his historic flight, had his headquarters as an air mail pilot, flying the mail plane between St. Louis and Chicago. It was at that field that the aviator laughed over the practical jokes he perpetrated on his fellow pilots. There newspaper reporters often sought him to learn the details of a daring parachute jump from the clouds.

St. Louisans think it appropriate that Lambert-St. Louis Field be enlarged and converted into a lasting memorial to the air mail pilot who made history.

Navy Goggle Contract

Strauss & Buegeleisen, of Brooklyn, have announced the awarding of a navy contract for goggles to their company. The contract covers the Commander type of goggle for Pilot standard, and the Resistal Standard Navy type for passenger use. The contract was awarded after a period of test and consideration by the Navy's Bureau.

Current Comment

The Air Treaties

By this time the various intricate angles concerning the operations of aircraft have probably been worked out by the sixth International Conference of the American States, which met at Havana. Naturally, aircraft are not as susceptible to regulation, particularly when flying between countries, as other forms of transportation. Unjust regulations and a too rigorous enforcement of measures meant only as protection in time of war result in nullification. Witness the condition in Turkey at the present time. Turkish regulations impose such a delay on flyers that the time saved by using air transportation is lost waiting for the Turkish authorities to give their permission for clearance. The result is that planes fly over Turkey and ignore the regulations.

Notwithstanding, regulations and definite understandings between countries are a necessity with regard to aircraft. Any country is entitled to protect its terrain from aerial espionage in time of war. To exclude neutrals, who might act as spies, without giving offense to an entire nation, it is necessary that the rights be defined by a treaty. Possibly the best attitude to take is that held by the United States and Canada, who apparently have a gentleman's agreement to deal with matters only as they come up and not attempt to forecast conditions as they may be ten or twenty years hence.

More "Airers" Fewer Errors!

When are the newspapers going to learn something about aviation! Reporters write glibly about corkscrew turns, air pockets and other non-existant things. A writer not long ago told of a pilot doing a "vertical reverse." The Lord and that writer alone know what that is—and maybe even the Lord doesn't know!

An Associated Press dispatch read: "Utterly beyond control, his little craft went completely 'haywire,' went spinning into a rain-drenched 'air pocket' and finally turned upside down. . . ."

The newspapers have long enough made a monkey of the erroneous term "air pocket" to hang aviation stories on, and now some reporter comes along and tells us of a "rain-drenched 'air pocket' "!

Another nit-wit cries to the world that Lindbergh nearly hits barn in forced landing on farm. Of course he nearly hit it. That's the whole idea in flying—to nearly hit and barely miss! The press boys don't realize it, but this nearly hitting is actually intentional on the part of the pilots. They have to nearly hit, or they may over-shoot and really hit!

May the newspapers forget about "vertical reverses" and get flyers to write the aviation news. More "airers" writing will mean fewer errors in copy!

Our New Dress

With a well designed and artistic colored cover POPULAR AVIATION takes another step forward. It may seem a surprising thing, except to a few who have had similar experiences, but it is a difficult thing today to find an artist who can make a plane look like a plane when it is in the air. Most of them look like the dream of some inventor or, if conventional, as if they had suffered from some outlandish rigging. We believe that our cover designs in the future will set a mark for other artists to shoot at. Comments and suggestions are in order.

Better Buy That Plane

Prospective purchasers of airplanes for use during 1928 should place their orders immediately or a disappointment may be in store for them. Company after company reports that they are not only behind on production (and this in the face of increased facilities for manufacture) but that each month shows a far greater number of orders than of deliveries. Individuals and firms are waking to the realization that a franchise as distributor for a plane in a given territory is a valuable asset and are seeking connections. The orders given by these dealers for demonstrators alone have swelled requirements to the point where prosepcts need to take immediate action in order to receive aircraft for this season's use.

The New Crop

It is about time for the planting of the season's crop of ocean hops. But this species of hops, when added to Neptune's briny brew, has a tendency to turn sour, and instead of a kick develop a kick-back. Properly safeguarded, ocean flights will have a definite value to aviation. Without

Current Comment

some preliminary flights, without the risk-taking pioneering, there could never be developed the trans-oceanic lines that are bound to become a reality in course of time. We can ask, and the industry has a right to insist, that such flights as are planned take place under proper safeguards and with some regard for the conditions that have to be met. Of course, one can insist that no flyer would start without a definite "percentage" in his favor, but the fact remains that there are always men who are ready to take a chance, even a 10 to 1 shot.

More Publicity Wanted

Judging from the number of letters coming to us from various parts of the country seeking information about passenger service, it would seem that comparatively few business men are aware of the extent of the service available on established lines. As a test we have casually mentioned to various acquaintances that one of our staff flew to the Pacific Coast and is making a tour of that section of the country by air. With one exception each person assumed that the trip was being taken in a specially chartered plane and expressed surprise that regular passenger service was available. Astonishment at the saving in time offered was practically unanimous.

In spite of the newspaper publicity given to air travel, it would seem that judicious advertising of air services now available would go far in acquainting the traveling public with the facilities now offered.

Finance and Aviation

Apparently, financial interests are awakening to the possibilities of aviation. For many years money, by which we mean available capital, has looked upon aviation as too hazardous a business for investment. This attitude has been changed during the past year. Up to this time men in aviation were looked upon as rather fanatical enthusiasts who seemed willing to lose time and money in developing flying machines for other fanatics to use for suicidal purposes. Things are different, now. The fanatics are experts and they are needed in the formation of corporations to supply the demand of the public for aircraft. Demand, when attended with a thin and insufficient supply, sings a siren song that money (especially with a capital M) considers quite alluring. May the old 'uns, who have been sticking through thick and thin, especially thin, now reap the benefit of their work through the lean years. And may those far sighted men of vision who have offered financial support through these same lean years find themselves now solidly entrenched.

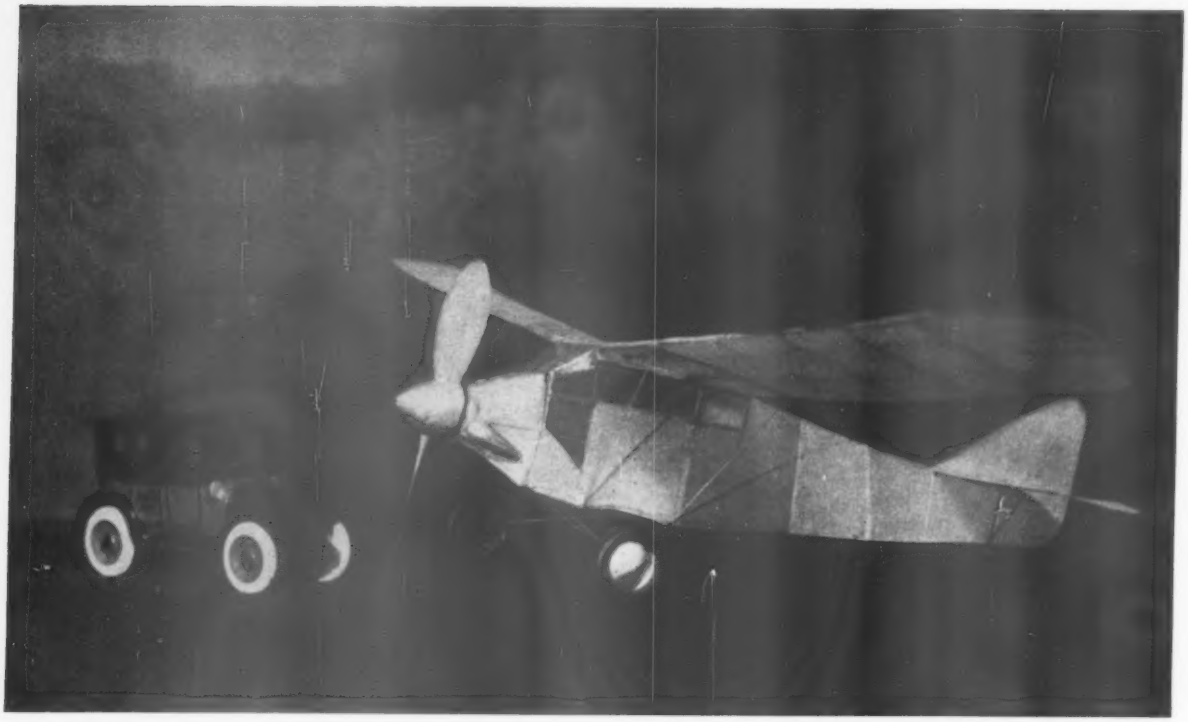
The Clubs Again

We would like to call especial attention to Mr. Ashbaugh's article on the organization of a flying club. One point is emphasized and deserved more than a passing thought. You will find the statement made that it is not easy to start a flying club and get it on a sound financial basis. This is true. Like anything else worth while it calls for a maximum of earnest and intelligent effort. It brings its reward, however, in many ways. There is no way to get something for nothing, and flight instruction costs money. Poor instruction is worthless, so the first consideration in starting a flying club should be the financial one, so that competent and adequate instructors may be hired. It is not sufficient to enlist the enthusiasm of local air-minded fans. Their financial support is a prime necessity. Mr. Rhea and his committee worked out a feasible scheme that has proved its worth by practical application in a typical American community.

The Aircraft Show

With the announcement of the Aircraft Show at Detroit comes the thought that it will not be long before such shows will become a part of the regular industrial program, just as they have in the automobile industry. Let us hope, however, that we are spared the "yearly" (or oftener) models, so that when we go to the 1930 show we will not curse the distributor who sold us one of the last of the 1929 models on which we will have to take 40 per cent depreciation before it is three months old.

Seriously, though, it is worth a thought on the part of manufacturers to avoid giving the public the impression that new and startling changes may be expected. The radio industry found that it suffered from advance rumors of radical changes that never materialized or that proved to be minor changes. Buyers held off to wait for new models. This may seem a foolish warning in the face of the conservative tendency of builders of the present day—but it is worth a thought.



Fairchild Cabin Model

As Built by Tudor Morris

THE Fairchild Monoplane is a well known modern plane. It is used in various commercial airways and was the accompanying plane on Lindbergh's tour of the U. S. The cle says: "Escort to Lindy Is Wonder Ship. Wings fold back on Fairchild Flier. Will fly without controls. Pay load capacity 1000 pounds yet fast enough that only a Pursuit ship can overtake it. Same model of motor as Lindy's ship. A real plane."

It lends itself to modeling very nicely and Mr. Morris found that it could be made to fly very well. He amassed a total of fourteen points (Third place—Junior), at the National Tournament at Memphis last October, including two of the eight beautiful first place *Popular Aviation* gold medals, with his Fairchild model. It will well repay anyone for the time spent to be the owner of a beautiful Fairchild Model like Mr. Morris'.

Mr. Morris had only a few dimensions and some magazine pictures to work from but since Mr. Morris made his model, *Popular Aviation* has printed more complete data on the "Fairchild All-purpose Cabin Monoplane." (See page thirty-seven of December *Popular Aviation*.) You will note a few differences in the picture of the model and the real machine on this account. The drawings for you to use in making the model are to the correct proportions and if followed carefully will give the finished model the same appearance as the big brother Fairchild. Before beginning the construction of your Fairchild study the drawing, pictures and instructions carefully as you can do a better job when you thoroughly understand the problem. If you will make a full size drawing to use as a pattern, it will help you considerably.

LIST OF MATERIALS

1—Balsa motor stick $\frac{7}{32}$"x$\frac{7}{16}$"x14".
1—Balsa propeller blank ¾"x1¾"x8".
1—Set balsa wing beams.
1—Strip balsa veneer for ribs, etc.
1—Balsa piece for nose.
2—Balsa pieces for wheels ⅝"x2¾" square.
1—2 oz. can ambroid model cement.
1—Rubber motor, 8 strands, $\frac{1}{32}$"x⅛" flat.
1—Bearing—large.
6—Washers—large.
2—Dress snaps (for nose).
1—Piece *cellophane* transparent paper (for windows).
2—Pieces Japanese tissue paper.
—No. 14 wire for shafts and hooks. No. 11 wire for misc. parts.
2—Large bank pins (large common pins).

We will take up the construction of the model in the following steps:

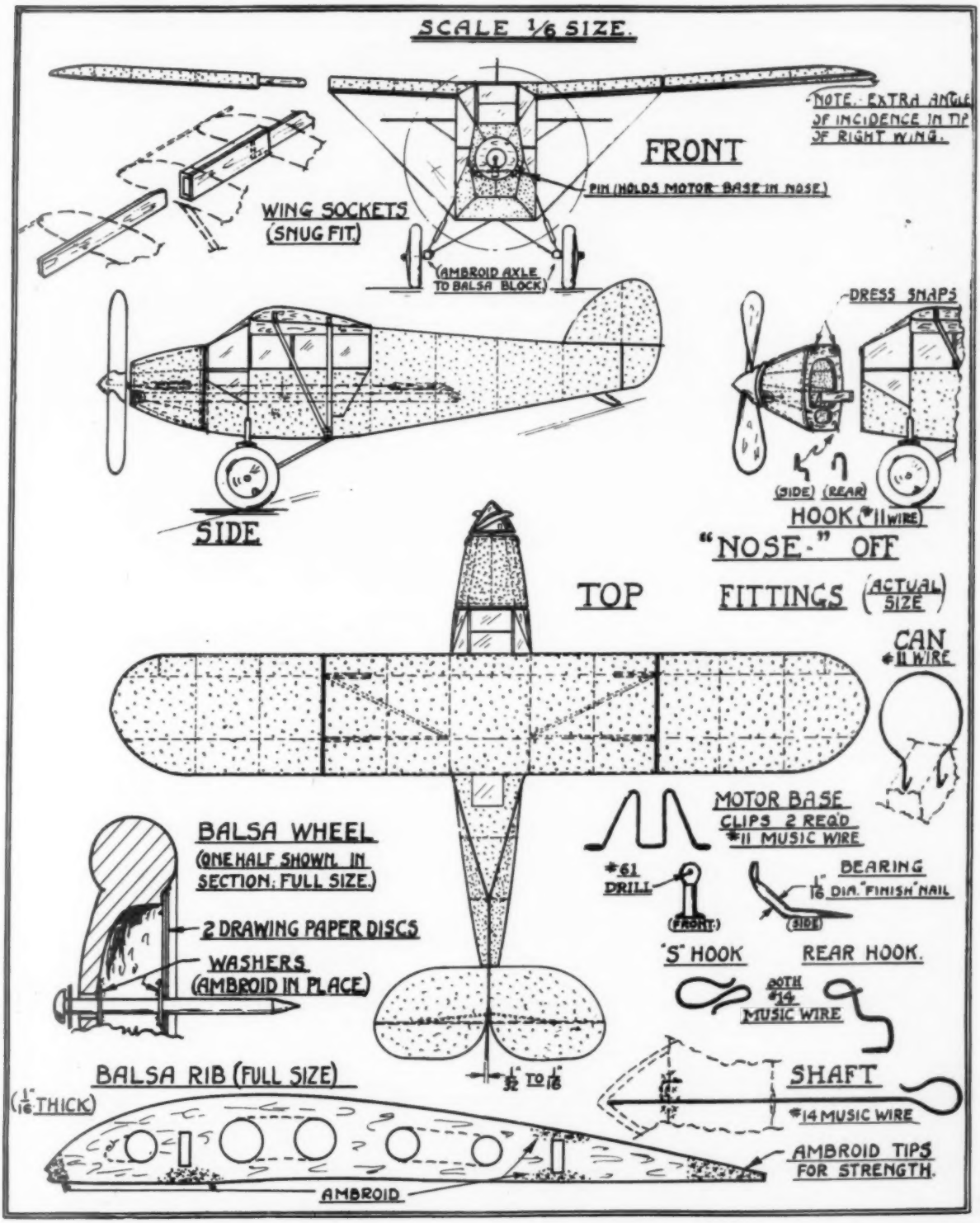
A. Body.
B. Propeller and motor stick.
C. Wings.
D. Summary.

BODY

If you have made a full size drawing you will find that the body especially will be easier to build. With the exception of the nose and motor stick the body is all constructed with bam-

(*Continued on page 57*)

Fairchild Cabin Monoplane Model



Phone For Passenger Rates

Air-Mail Schedules

AIRWAYS

Air Travel Information

Air-Express Schedules

† Express
*† Express and Passenger
Light face type —A. M.
Bold face type —P. M.

Express Mail — *New York to — NATIONAL AIR TRANSPORT — Chicago, 712 Miles*

Westbound	Close P. O.		Leave	Leave	Phone
	Day	Nite	Day	Nite	
New York, N. Y.	10:00	**6:30**	11:00	**8:00**	Lexington 8044
New Brunswick, N. J.	12:10	**9:30**	12:15	**9:35**	Nev. 4045
Cleveland, Ohio	3:35	1:35	3:35	1:30	Lakewood 9006
Chicago, Ill.			**7:00**	5:35	{ Harrison 8234 / Republic 4110

Eastbound	Close P. O.		Leave		Phone
	Day	Nite	Day	Nite	
Chicago, Ill.	6:30	**6:30**	8:00	**8:00**	{ Republic 4110 / Harrison 8234
Cleveland, Ohio	11:17	**11:30**	**12:15**	12:15	Lakewood 9006
New Brunswick, N. J.			**4:45**	4:45	Nev. 4045
New York, N. Y.			**7:00**	6:15	Lexington 8044

Passenger Express Mail — *Chicago to — BOEING AIR TRANSPORT — San Francisco, 1949 Miles*

Westbound	Close P. O.	Leave	Phone
Chicago	**6:30**	**7:50**	Wabash 8084
Iowa City, Iowa	**8:40**	**9:40**	425
Des Moines, Iowa			Maple 707W
Omaha, Nebr.	**10:30**	12:35	Atlantic 9301
North Platte, Nebr.		2:00	29
Cheyenne, Wyo.	3:30	4:45	656
Rock Springs, Wyo.	6:30	7:05	415J
Salt Lake City, Utah	9:00	10:50	Wasatch 5569-3321
Elko, Nev.	10:45	11:15	1553
Reno, Nev.	1:00	1:45	195
Sacramento, Calif.		2:45	
San Francisco, Calif.		Ar. 4:30	Kearny 2041

Eastbound	Close P. O.	Leave	Phone
San Francisco, Calif.	6:05	7:00	Kearny 2041
Sacramento, Calif.	8:15	7:45	
Reno, Nev.	10:00	9:00	195
Elko, Nev.	**12:15**	11:00	1553
Salt Lake City, Utah	**3:00**	3:05	Wasatch 5569-3321
Rock Springs, Wyo.			415-J
Cheyenne, Wyo.	**7:30**	**7:30**	656
North Platte, Nebr.			29
Omaha, Nebr.	**10:30**	12:30	Atlantic 9301
Des Moines, Iowa		Deliver 1:30	Maple 707W
Iowa City, Iowa			425
Chicago, Ill.		Ar. 5:45	Hemlock 8180

Passenger Express Mail — *Chicago to — NATIONAL AIR TRANSPORT — Dalas, 995 Miles*

Southbound	Close P.O.		Leave	Leave	Phone
	Day	Nite	Day	Nite	
Chicago, Ill.	6:30	**6:30**	7:30	**8:00**	{ Republic 4110 / Harrison 8234
Moline, Ill.	8:30	**6:50**	9:30	**9:50**	Moline 738
St. Joseph, Mo.	11:50		**12:50**		St. Joe-6-0349
Kansas City, Mo.		**11:50**	1:25	1:10	Norclay 1093
Wichita, Kan.		1:45		3:15	Market 6185
Ponca City, Okla.		2:40		4:10	Ponca 9601-F2
Oklahoma City, Okla.		4:30		5:25	Walnut 4214
Fort Worth, Tex.		7:15		7:35	Prospect 2169
Dallas, Tex.				8:00	5-7113

Northbound	Close P.O.		Leave		Phone
Dallas, Tex.		**6:00**		**7:00**	5-7113
Ft. Worth, Tex.		**6:30**		**7:30**	Prospect 2169
Oklahoma City, Okla.		**9:00**		**9:40**	Walnut 4214
Ponca City, Okla.		**9:50**		**10:50**	Ponca 9601-F2
Wichita, Kan.		**10:40**		**11:40**	Market 6185
Kansas City, Mo.	**1:00**	12:30	**2:05**	1:55	Norclay 1093
St. Joseph, Mo.	**1:40**		**2:40**		St. Jos. 6-0349
Moline, Ill.	**4:30**	4:00	**5:30**	5:10	Moline 738
Chicago, Ill.			**7:20**	7:00	{ Harrison 8234 / Republic 4110

Passenger Express Mail — *Chicago to — ROBERTSON AIRCRAFT CO. — St. Louis, 268 Miles*

Southbound	Close P. O.	Leave	Phone
Chicago, Ill.	5:20	5:50	Humboldt 8180
Peoria, Ill.	6:55	7:25	Peoria 8195
Springfield, Ill.	7:45	8:15	Main 190
St. Louis, Mo.		Ar. 9:15	Avery 2725

Northbound	Close P. O.	Leave	Phone
St. Louis, Mo.	**3:30**	**4:15**	Avery 2725
Springfield, Ill.	**4:50**	**5:20**	Main 190
Peoria, Ill.	**5:40**	**6:10**	Peoria 8195
Chicago, Ill.		Ar. 7:30	

Passenger Express Mail — *Salt Lake City to— WESTERN AIR EXPRESS — Los Angeles, 633 Miles*

Westbound	Close P. O.	Leave	Phone
Salt Lake City, Utah	8:30	9:10	Wasatch 7023
Las Vegas, Nev.	2:10	2:25	Angeles 1786
Los Angeles, Calif.		Ar. 5:25	Trinity 6754

Eastbound	Close P. O.	Leave	Phone
Los Angeles, Calif.	6:30	7:35	Trinity 6754
Las Vegas, Nev.	9:50	10:40	Angeles 1786
Salt Lake City, Utah		Ar. 3:20	Wasatch 7023

AIRWAYS—Continued

Mail — *Salt Lake City to —* * *WALTER T. VARNEY* — *Pasco, 540 Miles*

Westbound	Close P. O.	Leave	Phone	Eastbound	Close P. O.	Leave	Phone
Salt Lake City, Utah	9:00	10:00	Wasatch 5755	Pasco, Wash.		6:00	31
Boise, Ida.	Ar. 12:30	2:50	2901	Boise, Ida.	9:00	9:20	2901
Pasco, Wash.		6:00	31	Salt Lake City, Utah		Ar. 2:45	Wasatch 5755

Passenger Express Mail — *Seattle to —* *PACIFIC AIR TRANSPORT* — *Los Angeles, 1,080 Miles*

Southbound	Close P. O.	Leave	Phone	Northbound	Close P. O.	Leave	Phone
Seattle, Wash.	11:20	11:45	Elliot 6688	Los Angeles, Calif.	11:20	12:01	Vermont 4279
Vancouver, Wash.	6:15		Vancouver 1307	Bakersfield, Calif.	1:15	1:45	5655
Portland, Ore.		7:00	241	Fresno, Calif.	2:15	3:30	179-J-12
Medford, Ore.	9:00	9:30	Walnut 4304	San Francisco, Calif.	4:15	5:30	Douglas 3301
San Francisco, Calif.	12:25	1:15	Douglas 3301	Medford, Ore.	8:30	9:30	Walnut 4304
Fresno, Calif.	2:15	3:15	179-J-12	Portland, Ore.	11:15		241
Bakersfield, Calif.	3:50	4:45	5655	Vancouver, Wash.		12:00	Vancouver 1307
Los Angeles, Calif.		Ar. 6:15	Vermont 4279	Seattle, Wash.		Ar. 2:00	

Passenger Express Mail — *Cheyenne to* *WESTERN AIR EXPRESS* *Pueblo, 199 Miles*

Southbound	Close P. O.	Leave	Phone	Northbound	Close P. O.	Leave	Phone
Cheyenne, Wyo.	4:10	5:30		Pueblo, Colo.	3:20	4:00	
Denver, Colo.	5:25	6:55		Colorado Springs, Colo.	3:30	4:50	
Colorado Springs, Colo.	6:30	7:50		Denver, Colo.	5:20	6:00	
Pueblo, Colo.		Ar. 8:30		Cheyenne, Wyo.		Ar. 7:30	

Passenger Express Mail — *Chicago to* — *NORTHWEST AIRWAYS* — *Minneapolis, 377 Miles*

Westbound	Close P. O.	Leave	Phone	Eastbound	Close P. O.	Leave	Phone
Chicago, Ill.		5:50	Hemlock 8180	Minneapolis, Minn.	1:30	2:30	
Milwaukee, Wis.		6:50		St. Paul, Minn.	2:10	2:40	Cedar 5693
Madison, Wis.				La Crosse, Wis.	3:30	4:00	
La Crosse, Wis.		9:30		Madison, Wis.			
St. Paul, Minn.		11:30	Cedar 5693	Milwaukee, Wis.	5:15	6:00	
Minneapolis, Minn.		Ar. 11:40		Chicago, Ill.		Ar. 7:00	Hemlock 8180

Passenger Express Mail — *Boston to* — *COLONIAL AIR TRANSPORT* — *New York, 219 Miles*

Southbound	Close P. O.	Leave	Phone	Northbound	Close P. O.	Leave	Phone
Boston, Mass.	5:15	6:15	Hancock 4612	New York, N. Y.	3:00	6:00	Ashland 7750
Hartford, Conn.	6:15	7:35	2-9211	Hartford, Conn.		6:35	2-9211
New York, N. Y. (Hadley Field)		Ar. 9:15	Ashland 7750	Boston, Mass.		Ar. 8:05	Hancock 4612

Mail Express — *Cincinnati* — *THE EMBRY-RIDDLE CO.* — *Chicago, 267 Miles*

Eastbound	Close P. O.	Leave	Phone	Westbound	Close P. O.	Leave	Phone
Chicago		6:00		Cincinnati		2:45	East 4254
Indianapolis		7:55		Indianapolis		3:00	
Cincinnati		Ar. 10:00	East 4254	Chicago		4:45	

Passenger Express — *Los Angeles* *THE AERO CORPORATION OF CALIFORNIA* — *Tucson, 480 Miles*

Eastbound	Leave	Westbound	Leave
Los Angeles	10:00	Tucson	8:00
Phoenix	3:20	Phoenix	9:25
Tucson	Ar. 5:00	Los Angeles	1:00

Light face type—A. M.
Bold face type—P. M.
*Walter T. Varney lines make train connections

Time used is local time, whether Eastern, Central, Mountain or Pacific. with Portland-Spokane-Tacoma-Seattle.

Incomplete data will be filled in as rapidly as authentic information can be compiled.

AIRWAYS—Continued

Mail Freight — *Detroit to* — *FORD AIRLINES* — *Cleveland, 91 Miles*

Southbound	Close P. O.	Leave	Phone	Northbound	Close P. O.	Leave	Phone
Detroit, Mich.	9:10	10:40		Cleveland, Ohio	1:30	3:00	
Cleveland, Ohio		Ar. 12:10		Detroit, Mich.		4:30	

Mail Freight — *Detroit to* — *FORD AIRLINES* — *Chicago, 237 Miles*

Westbound	Close P. O.	Leave	Phone	Eastbound	Close P. O.	Leave	Phone
Detroit, Mich. (Central Time)	11:30	1:00		Chicago, Ill.	6:30	8:00	
Chicago, Ill.		3:00		Detroit, Mich.		Ar. 12:00	

Mail — *Cleveland to* — *CLIFFORD BALL AIRLINE* — *Pittsburgh, 121 Miles*

Southbound	Close P. O.	Leave	Phone	Northbound	Close P. O.	Leave	Phone
Cleveland, Ohio		12:15		Pittsburgh, Pa.		2:30	
Youngstown, Ohio		1:00		Youngstown, Ohio		3:15	
Pittsburgh, Pa.		Ar. 1:45		Cleveland, Ohio		Ar. 4:00	

Passenger — *Detroit to* — *STOUT AIR SERVICES* — *Cleveland, 91 Miles*

Southbound		Leave	Phone	Northbound		Leave	Phone
Detroit, Mich.		9:15	Clifford 0106	Cleveland, Ohio		9:15	Main 8833
Cleveland, Ohio		Ar. 10:55	Main 8833	Detroit, Mich.		Ar. 10:55	Clifford 0106
Detroit, Mich.		3:15	Clifford 0106	Cleveland, Ohio		3:15	Main 8833
Cleveland, Ohio		Ar. 4:55	Main 8833	Detroit, Mich.		Ar. 4:55	Clifford 0106

Passenger Express Mail — *Galveston* — *TEXAS AIR TRANSPORT* — *Dallas, 318 Miles*

Northbound	Close P.O.	Leave	Phone	Southbound	Close P.O.	Leave	Phone
Galveston, Tex.	3:40	4:00		Dallas, Tex.	6:45	7:45	
Houston	4:05	4:45		Ft. Worth	7:15	8:15	
Fort Worth	6:30	7:15		Houston		10:50	
Dallas	6:00	7:37		Galveston		11:30	

Passenger Express Mail — *Dallas* — *TEXAS AIR TRANSPORT* — *San Antonio, 322 Miles*

Northbound	Close P.O.	Leave	Phone	Southbound	Close P.O.	Leave	Phone
San Antonio	3:45	4:15		Dallas	6:45	7:45	
Austin	4:40	5:10		Ft. Worth	7:15	8:15	
Waco	5:30	6:15		Waco	8:40	9:20	
Ft. Worth	6:30	7:15		Austin	10:00	10:25	
Dallas	6:00	7:37		San Antonio		11:15	

Light face type—A. M.
Bold face type—P. M.

Time used is local time, whether Eastern, Central, Mountain or Pacific.

Incomplete data will be filled in as rapidly as authentic information can be compiled.

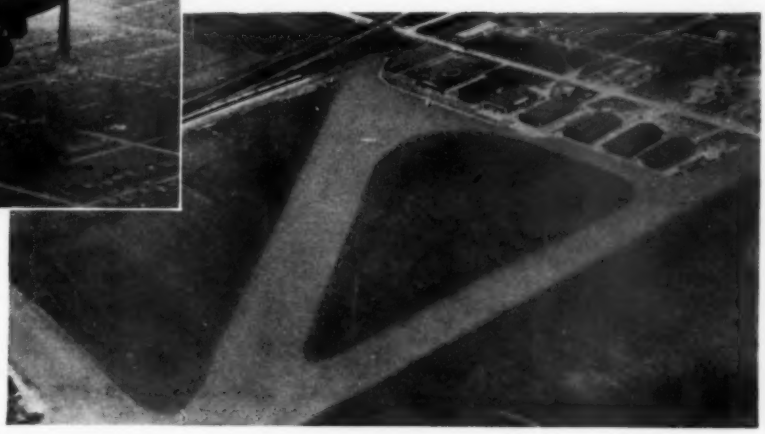
The foregoing schedules of airways information, while carefully compiled, are not guaranteed to be correct, but every effort and precaution is used and will be, from now on, in keeping this schedule up to date.

An attempt has been made to print a schedule which is readable and may be understood by all who have use for air transport, whether air mail, passenger, or express service. It is published for the purpose of promoting air transportation and educating our readers so that they may intelligently answer questions regarding aircraft operations when such information is requested.

The present air transport companies now operating and listed above, are primarily trunk lines, but there is a new phase of air transport, heretofore seemingly neglected, springing up throughout the country, namely, Aerial Taxi Service. We hope, in the near future, to be able to print authoritative information on this class of service wherever it prevails with the proper kind of equipment, so that at any time anyone seeking air travel information may refer to POPULAR AVIATION and there find the answer.

We would appreciate comments from our readers as to how we can further make this schedule better suited for their particular needs, as it is the ambition of POPULAR AVIATION to assist in bringing the industry closer to the market.

Learn to Fly Now!



In These Planes

Imagine yourself in this plane high over the crowded city—below the fields stretch like a huge checkerboard—rivers are silver streaks. This is a life of thrill and excitement—pleasure and profit—a life that can well be yours.

Aviation is the world's coming industry—one that offers more opportunity now to the man ready to seize this opportunity than any other.

Learn to fly now with us in Chicago, America's center of aviation, at the finest flying field in the Middle West, where daily the air liners from all over the country bring their cargoes of passengers, express and mail. Our course includes everything you need know about flying—rigging and repair, motors, construction, covering, management, are all taught in our big down town factory and you learn to fly at Chicago's Municipal Airport.

At This Airport

UNLIMITED FLYING TIME

The Chicago Aviation Company was the pioneer in removing the bond for breakage. Now the new feature of unlimited flying time means a guarantee to you that you will learn how to fly. Only volume business makes this possible. Before you pick your school, be sure to investigate our "Unlimited Flying Time" offer.

Big Free Book "How to Fly"

Chief Pilot Bassett has written a book on flying that everyone interested in this new industry should have. The first edition of this big book we are giving without charge to those interested. We will be glad to mail a copy to you upon request if you act at once. Just tear off the coupon, sign it and send it in today to make sure of securing your copy.

Chicago Aviation Company
737-745 S. Clark St., Chicago, Ill.

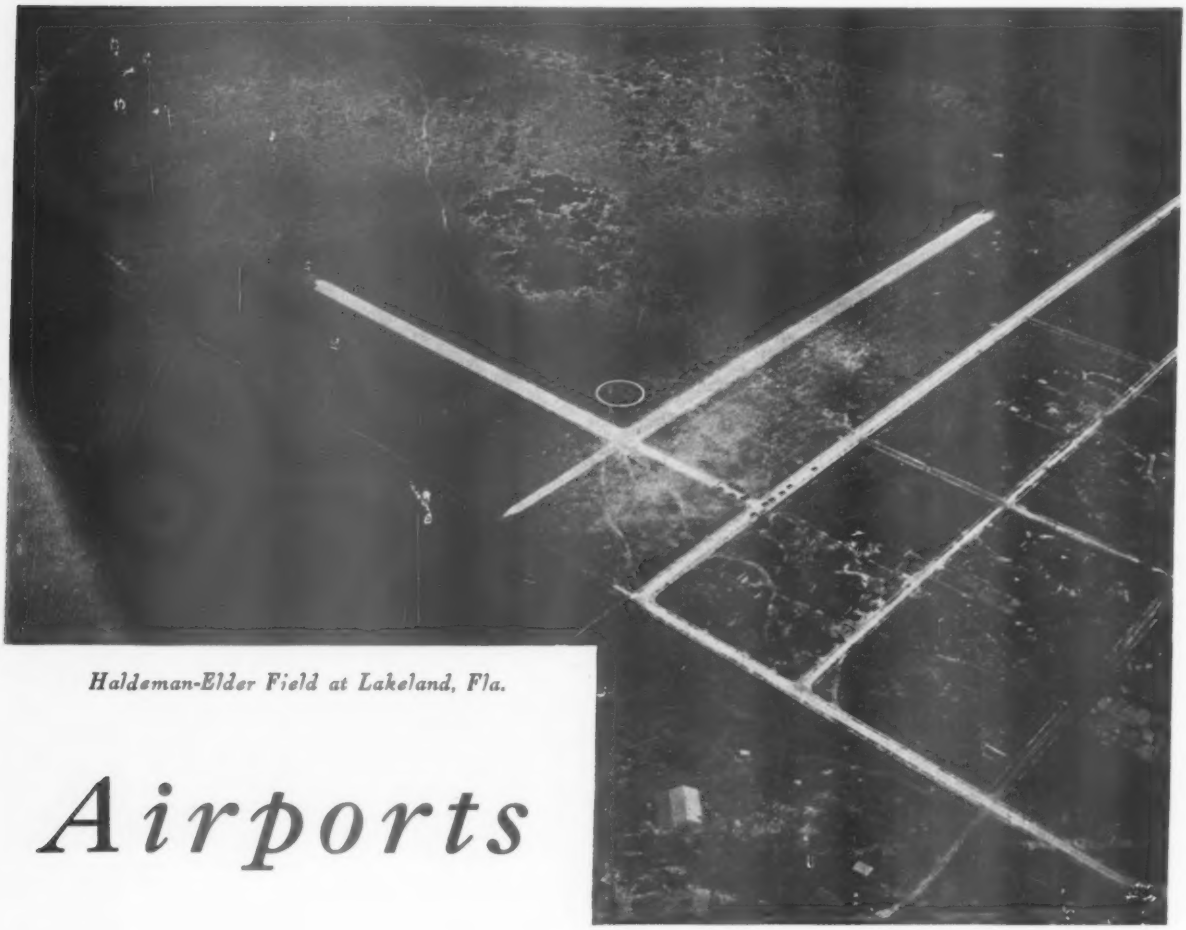
Chicago Aviation Company
737-745 S. Clark St.
Chicago, Illinois.

Gentlemen: I am interested in Aviation. Please send me a copy of your Free Book "How to Fly."

NAME_____

ADDRESS_____

TOWN_____ STATE_____



Haldeman-Elder Field at Lakeland, Fla.

Airports

New Lakeland Field

Taking advantage of their opportunity and being urged by the Chamber of Commerce and other civic organizations, the City Commissioners with characteristic energy have secured for their city of Lakeland, Florida, an airport which they hope to soon see developed into one of the best if not the best all-around airfield in the state. For five years repeated efforts had been made by George Haldeman to have his home city secure an airport but without avail. Laying that aside for the moment he chose to make the attempt to fly by a longer route to France, having as his companion the now famous Ruth Elder.

Although as is well known the attempt was not altogether a success, no lives were lost and doubtless the few hundred miles remaining uncovered would have been spanned had not adverse winds been against him. Now George saw upon his return home the very thing accomplished by the enthusiastic fellow citizens that he had tried so hard in other ways to accomplish. He proved by this that there are many ways of skinning the proverbial cat than—etc.

When George left home to make his ocean flight the only place to land a plane safely was his own private lot near his home on Lake Gibson, but when he alighted on the return trip he found a splendid field located at Eaton Park, just outside the city limits, comprising one hundred and sixty acres of level land splendidly adapted for the purpose proposed both by shape, contour and location. It is by air only two miles from the heart of the city and three miles by automobile, located alongside a paved road 3,960 feet and bounded by a graded road 2,540 feet, being less than a quarter mile from the main county road from Lakeland to Bartow. This road being said to be one of the busiest and most important in the state. It has a regular bus service to and from all parts of the state each thirty minutes of the day, thus affording unlimited means of getting to and from the field for those bent upon making a visit to the city and environs by air.

This effectively meets the popular idea that air fields are usually located at such a distance from the average city as to render a commercial flying service a time waster on account of getting to and from the city.

Securing the aid of the best air field engineers the commissioners soon had contracts let to place runways on the field to care for the traffic now expected. These runways, two in number, are each fifty feet in width with that running east and west 1,650 feet in length and the north and south one 1,250 feet long. It is constructed entirely of Florida lime rock rolled and graded to meet the most rigid specifications. This runway, according to the army engineers, Brig. Gen. E. E. Booth of Washington and W. O. Snyder, Field Director Airways Division and

The Game for Daring Young Men

GET away from the dull, prosaic grind of humdrum work—the narrow restrictions of petty, uninteresting jobs! Break into one of the most fascinating, most thrilling occupations since time began—Aviation—the virile, exciting, romantic game for men of sporting blood.

Many of the big men of the coming generation will be men with the foresight to get into Aviation now—while opportunities abound. They can see that the Golden Age of Aviation has just begun—that the future is almost too stupendous to be imagined.

What other occupation offers you more amazing opportunities? Thrills such as you never had before—the praise and plaudits of the multitude—and a chance to get in on the ground floor where rewards may be unlimited.

Aviation is growing so swiftly that one can hardly keep track of all the astonishing new developments. The skies are dotted with daring young men—from every country come stories of new feats—new victories—new heroes! Everything is set for one of the greatest booms in history. Big fortunes came out of the automobile industry and out of motion pictures. Big fortunes will also come out of Aviation! The development of Aviation as an industry is bringing with it a call for trained men. Those who qualify quickly should find themselves on the road to undreamed of money—success—popularity—and prominence!

Easy to Become an Aviation Expert!

Get into this thrilling business at once while the field is new and uncrowded. Now—by a unique new plan—you can quickly secure the preliminary training necessary to get a start in the Aviation Industry, either flying or ground work, at home during your spare time. Experts will teach you the secrets—give you the inside facts that are essential to your success. And, the study of Aviation by our method is almost as fascinating as the actual work itself. Every Lesson is chock-full of interest—and so absorbing that you actually forget you are studying. But best of all are the ultimate rewards you are fitting yourself to gain!

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Light Houses, Department of Commerce, Washington, is a complete departure from the usual runways and they with others of the air forces will keep tab on them to see how well the methods and materials used here pan out. The lime rock, being almost snow white, will give an almost ideal landing field for night flying as it can so easily be picked up in the darkness without the need for artificial lighting on account of the texture of the field and the known clearness of Florida's nights. The field will cost the city approximately $10,000, omitting the cost of the land, which has been leased at a nominal figure for a period of years with an option to release for another term at a small increase in price. The runway has cost to date approximately $4,500.

Crowd assembled at dedication of Haldeman-Elder Field at Lakeland, Fla.

A wind cone has been erected and lights run out to the field so that night flying may be indulged in if so desired. Already an airplane company has been interested in locating there for giving exhibition flights and the promotion of flights. They have sold three planes to date, one to a local man, and state that others are contemplating the purchase of air transportation. Within a very short time it is hoped to have hangars erected on the field for any planes which might come this way and to make it so attractive that when the great airport for the southeast is placed Lakeland will not be passed up without a chance. All possible is being done to give the field a permanent standing.

New Denver Port

A new commercial airport is being established in Denver by the Denver Union Airport, a subsidiary of the Rocky Mountain Airlines. The company has purchased a tract of 281 acres, adjoining Lowry Field, a distance of about 4 miles from the Denver postoffice. The new port will have eight runways, each 3,500 feet in length and lights will be installed. Officials of the new company are: O. E. Brueggeman, builder of Brooks Field, San Antonio, Texas; Paul B. Lanius, president of the Rocky Mountain Ratio Corp.; Charles R. Enos, of Enos, Healy & Chisholm; W. H. Edmunds, general manager of the Denver & Interurban; and James D. Hill. These men are also directors of the Rocky Mountain Airlines, and recently organized the Mile High Aviation School.

Utah-Montana Mail

Albert Frank, of Salt Lake City, has been awarded the contract for the transportation of air mail over the route between Salt Lake City and Great Falls, Montana. Five planes will be used to supply the necessary service. The Postoffice Department announces that the bid was $2.475 cents a pound. The date of the opening of the new service has not been announced but the route has been laid out between Salt Lake City and Great Falls, and passes through Pocatello, Idaho, Butte and Helena, Montana. It is understood that Mr. Frank has the backing of commercial interests at Salt Lake City and that a company with a capitalization of $100,000 will be formed to operate the line.

More Municipal Airports

The following cities have signified their intention of establishing municipal airports:

Mobile, Ala.
Crescent City, Calif.
Manford, Calif.
Long Beach, Calif.
Santa Maria, Calif.
Lamar, Colo.
Bradentown, Fla.
Gainesville, Fla.
Nampa, Idaho.
East St. Louis, Ill.
Louisville, Ky.
Caribou, Me.
Baldwin, Mich.
Duluth, Minn.
Fergus Falls, Minn.
Biloxi, Miss.
Far Rockaway, N. Y.
Lake Placid, N. Y.
Salisbury, N. C.
Devil's Lake, N. D.
Cincinnati, Ohio.
Neppner, Ore.
Albany, Ore.
Crosbyton, Texas.
Graham, Texas.
Petersburg, Va.
Roanoke, Va.
Enumclaw, Wash.
Huntington, W. Va.
Charleston, W. Va.

New Flying Service

Day and night sight-seeing, taxi and cross country flight planes with uniformed attendants have been put into service at Chicago by the NAT Flying Service, a subsidiary of the National Air Transport. For many months the latter company has had to reply to many inquiries for special trips that no facilities were available, but now a Ford-Stout all metal tri-motored monoplane and a Travel Air four passenger monoplane are available at all hours.

The Ford-Stout will be used for sight seeing trips, and three regular

Three Thousand Hours—!

Practical experience; steady development; nothing but the best in materials and construction—these are the foundation stones upon which the success of TRAVEL AIR has been built—the reasons why it is steadily receiving the unqualified endorsement of the Air-minded everywhere.

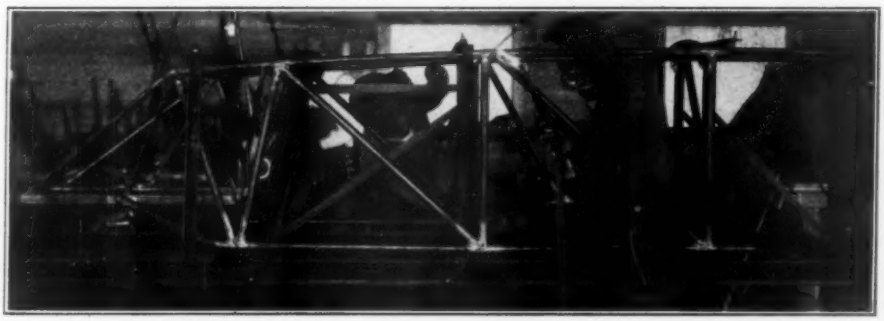
Still in Good Condition

THUS writes the enthusiastic owner of *six* TRAVEL AIR Planes. Read his comments on the service he has received:

"They are all right and if they weren't we wouldn't be buying them. Our run undoubtedly taxes a machine to the limit, and when I say it is good, you can depend upon it that it is. Possibly no other company in the United States has the opportunity to test a machine under such severe conditions.

"One of these machines has had over 1500 hours flying time with no replacements or covering. Another of them is used by one of our flying schools. It has had over 3000 flying hours and is still in good condition."

Here's One Reason Why



The fuselage framework must be light—yet VERY strong. Welding the steel tubing that forms this framework is a delicate and exacting operation, requiring special skill on the part of the most highly trained mechanics. This is but one of hundreds of equally important operations in the creation of an airplane that meets all the requirements of modern aviation from the standpoint of reliability, safety, and actual performance.

Descriptive Catalog on Request—Tells the Story of Travel Air

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FOR AIR TRAVEL

Monoplanes
Biplanes
Custom Built Jobs

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General Offices—WICHITA, KANSAS

tours will be made daily, at 10:30 a. m., 3:00 p. m. and 8:00 p. m. The trip covers the loop district, sweeps along the shore of Lake Michigan and circles the great park system.

The Travel Air will be used for taxi and cross country work and may be hired for a given point, near or far. Both planes will operate from the Municipal field.

Record Time

On Friday, Jan. 13, the Boeing Air Transport plane left San Francisco four hours behind schedule. It arrived in Chicago two hours ahead of schedule, with an average time of 131.1 miles per hour. A strong tail wind was blowing steadily, which accounted for the great speed. The distance on the route is 1,918 miles. Boeing's time was 14 hrs. 39 min. against the usual time of 20 hrs. and 40 min.

1742 Planes Per Mile

One square mile of air can accommodate 1,742 large airplanes on one level, allowing for proper clearance between each, according to calculations based on the present air traffic regulations. This was the reply of Major Ernest L. Jones, chief of the Information Section of the Aeronautics Branch of the Department of Commerce to a telegraphic inquiry from California, which seems to anticipate early congestion of air traffic. The same number can fly at the next 300 foot level and so on up, Major Jones informed his inquirer. Up to 12,000 feet this number would be multiplied 40 times, making a total of 69,680 planes.

Asked whether he would like to be in a plane flying on the top level which went into a spin, Major Jones said that, personally, he would prefer to be riding in an automobile 100 miles away from there. He insisted that he lacked imagination where visualizing congestion of the airways was concerned and consequently stuck by the regulations. He hopes that the party in California was satisfied that the congestion of air traffic does not present an immediate problem.

Double-faced sign erected to show way to airport at Hastings, Nebr. Arrow on top points to field.

New Airmarking

The following cities have provided airmarking recently:

Des Moines, Iowa.
Arlington, Mass.
Lowell, Mass.
Lynn, Mass.
Salem, Mass.
Saugus, Mass.
Helena, Mont.
Buffalo, N. Y.
Crestline, Ohio.
Norwalk, Ohio.
Warren, Ohio.
Berwick, Pa.
Blackstone, Pa.
Lewistown, Pa.
Philadelphia, Pa.
Pawtucket, R. I.
Spartansburg, S. C.
Huron, S. D.
Seguin, Texas.
Rutland, Vt.
Richmond, Va.
Suffolk, Va.

Railroad Landing Decks

Postmaster General Harry S. New looks to the railroads for the provision of fair transport terminal facilities in large cities. Asserting that landing fields must be near enough to the business center of cities to enable the passenger to get from the field to his ultimate destination without too great loss of time, "why is it not mechanically possible," he asks, "to make landing decks above the railroad tracks?"

The Postmaster General is impressed with the use of airplane carriers in the naval service.

"Quite recently," he says, "the greater navies of the world have supplied their own landing fields by building ships especially designed for the purpose. The whole upper deck is a landing field without an obstacle from stem to stern to interfere with the taking off and landing of a plane, of which there are many stored on the lower decks to be brought into place by means of elevators. If a well-equipped landing field is possible of arrangement on the deck of a ship, may it not be equally possible at the railway terminals?

"I have some reason to believe that the railroads are already giving thought to this, and I anticipate that the expansion of air transportation may require that they follow the thought with action. The automobile and the bus lines compelled not only the city and interurban traction lines to review their whole financial programs but they have had a very serious effect even on the trunk line railroads. Does that suggest anything with reference to transportation in this new field? How about the Bush Terminal in New York City? The great expanse of tracks immediately contiguous to the depot at Washington would afford space for one of these upper story landing fields no less convenient than the depots and post offices themselves."

Gray Goose Expands

The Gray Goose Airlines, Chicago, have added a Laird Commercial, with Wright Whirlwind motor, in order to take care of additional calls for service that do not require the use of the Stinson-Detroiter cabin monoplane now in service.

WACO Distributors

Outselling all Other Airplanes 2 to 1

With Efficient Service Facilities Ready to Serve You

Our Distributors are the outstanding leaders. Marketing the largest number of Commercial planes.

This tremendous volume of business in the airplane field has put them in the first rank as regards knowledge of service to the ultimate purchaser.

They are now taking shipments of WACO planes faster than we are able to build them. They will gladly demonstrate WACO features and explain their facilities for service.

Through the WACO Distributor organization you are able to get all the personal service on ship or motor that you have become accustomed to expect from the automobile dealer. In addition their service includes flight instruction.

Approved Type Certificates No. 11 and No. 13

Write or Wire Your Nearest Distributor.

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American Aircraft Corporation, Merritt Building, Los Angeles, California—*Cal., Nevada, New Mexico and Arizona*

Douglas H. Davis, 1439 Copeland, Atlanta, Georgia—*Georgia, Alabama*

Otis A. Hardin, Sebring, Florida—*Florida.*

Rankin Flying Service, Portland, Oregon—*Oregon and Wash.*

Knapp Flying Service, Ypsilanti Airport, Ypsilanti, Michigan—*Michigan*

Tex LaGrone, 441 Knickerbocker Place, Kansas City, Missouri—*Mo. and Kansas*

Ludington Exhibition Company, 810 Atlantic Building, Philadelphia, Pennsylvania—*Eastern Pennsylvania*

Midwest Airways, Monmouth, Illinois—*Illinois and Iowa*

Montana Air Service, Dillon, Montana—*Western Montana*

New England Aircraft Corporation, 805 Main Street, Hartford, Connecticut—*New England States*

Midsouth Airways, Crosstown Station, Memphis, Tennessee—*Arkansas and Mississippi*

Southern Dusting Company, Tallulah, Louisiana—*Louisiana*

Earl T. Vance, Great Falls, Montana—*Eastern Montana and Western N. D.*

Roscoe Turner, Richmond, Virginia—*Richmond, Va. and Vicinity*

West Virginia WACO Sales, Wheeling, West Virginia—*West Virginia*

E. M. Renna, Buffalo Airport, Buffalo, New York—*Western New York State*

Charles Prohinsie, Curtiss Field, Garden City, Long Island, New York—*New York City and Vicinity*

University Aerial Service, Austin, Texas—*State of Texas*

Elliott Springs, Fort Mill, South Carolina—*South Carolina*

Clifford Ball, McKeesport, Pennsylvania—*Pittsburgh and Vicinity*

Northern Airways, Inc., Wausau, Wisconsin—*Wisconsin and Minnesota*

Capitol Airways, Inc., 3515 Colorado Ave., N. W., Washington, D. C.—*Western Maryland and D. C.*

Clyde Shockley, Kokomo, Indiana—*Northern Indiana*

Rollin H. Stewart, Indianapolis Aviation Co., Indianapolis, Indiana—*Central and Southern Indiana*

Alfredo Hornedo, El Pais, Havana, Cuba—*Island of Cuba*

And Many Dealers

Aero Club News

Los Angeles Flying Club

Under the guidance of Mr. Jean Brooks, formerly of the Royal Flying Corps, the Los Angeles Flying Club is being organized in conjunction with the American Society for Promotion of Aviation. A list of the many A. S. P. A. members in Los Angeles has been forwarded to Mr. Brooks and it is expected that shortly a very live organization will be functioning. As evidence of what can be accomplished in a community that becomes interested in Aviation is best evidenced by the fact that the Worcester Society for the Promotion of Aviation, organized in conjunction with the A. S. P. A. has, in three weeks' time, secured 119 paid up memberships and are in a fair way to purchase their own plane this coming Spring.

African Light Plane Club

The first airplane for the Johannesburg light airplane club arrived recently at Durban, South Africa, according to a report from G. K. Donald, Consul, Johannesburg, made public by the Department of Commerce. The new plane has a 27.6 horsepower motor and its landed cost is said to be approximately $4,000. Another plane is on order.

Manhattan Aero Club

The Manhattan Aero Club which was recently organized in New York City has established itself on a firm footing. The club elected as its governing body a group of well qualified men. The officers elected were P. W. Stevens, of the American Society for Promotion of Aviation and ex-flyer, President; Vice-President is Robert A. Carter, ex-British aviator and editor of Air-Stories magazine; Secretary, P. J. Crasto III; and as Chairman of the Board of Governors, Arthur G. Solomon, expert on Aviation Law and Reserve Officer. Congressman F. H. La Guardia and Roger Wolfe Kahn are members of the Advisory Board. Jack B. Moore of The United States Steel Corporation is Treasurer of the organization. The club is giving its members a free ground school training and is contemplating purchasing a plane early in the spring for use of its members. The distinctive design of the Manhattan Club, which was specially prepared for it and the name Manhattan Aero Club has been copyrighted and registered in the United States Patent Office by Mr. Solomon on behalf of the club. The membership of the club now totals over 125 active members and the ranks are rapidly filling out. The club's address is Room 525, 522 Fifth Avenue, N. Y. C.

Present personnel of one of our oldest college aero clubs, the Harvard Flying Club.

Denver, Colorado

The Mile High Flying Club, Denver, Colo., has been organized by enthusiasts and a site for a clubhouse selected at the airport of the Rocky Mountain Airlines, located at East 46th and Colorado Blvd. The sponsors of the organization are Baxter Lanius and Charles R. Enos, and the others who are taking active interest in the formation of the club are: George H. Shaw, M. J. Bennett, Charles Boettcher II, Norman Barwise, W. H. Edmunds, Theodore Chisholm, W. L. Taylor, Emerson B. Evans, C. R. Kiefer, James D. Hill, John Loiseau, W. V. Black, C. J. Niehaus, Lou K. Brown, P. W. Boeren, L. Goldberg, John Nylen and Emile Paulson.

Membership will consist of three classifications; first, students who are taking instruction in flying; second, pilots and reserve officers who have had flying experience; and third, associate members who wish time in the air as passengers. The organizer of the club was Stanley H. Ferguson. Women are eligible and the first one to take advantage of the club facilities is Mrs. Charles R. Enos.

"Fly for a Dollar"

Splendid reports are being received from the Gates Flying Circus who are now making a tour of the country under the auspices of the American Society for Promotion of Aviation in a "fly for a dollar" campaign. The

Air-King

ASK any Air-King pilot to tell you about the amazing performance of this ship in the air.

The Air-King owners are its staunchest supporters — take their word—and investigate this ship.

Write for Catalog

National Airways System

Field 6, Lomax, Illinois

Circus reached Richmond, Va., December 6th and carried over 1,200 passengers in the week. They then visited Raleigh and Florence in the Carolinas and are now enroute to Miami. The Circus will work towards New Orleans via the Mississippi Valley and back East during the early Spring. The thousands of persons being carried for one dollar are becoming active sales agents for Aviation in their communities.

Port Richmond, N. Y.

I will give you the history of our outfit, the Aero Club of Richmond, and you can write your own story. The writer has been a reserve officer for the past six years in the "Fighting Quartermaster Corps," and if you think for a minute there is no fighting in that branch of the service, just walk up to a Quartermaster and try to get something.

I was on active duty for two weeks, one day, at Miller Field, Staten Island, I was supposed to have been on duty with the Quartermaster, anytime they wanted me, which was very seldom, they found me hanging around the National Guard Hangars, just itching for a hop, but being in all my glory of a second lieutenant in a bright shiny uniform and Sam Browne, I felt a little too proud to ask. Finally after seeing me around so much and no doubt hoping to get rid of me, one of the officers took me up for my first hop, and I should kiss your tail skid, that boy sure gave me the works.

For the first fifteen or twenty minutes I felt so fine and confident that I could have walked the wings, but after that—a funning feeling began to crawl over me—perspiration began to ooze out of my forehead and my hands, funny thing never happened before and I could not account for it. I guess the guy with the stick in his hands began to get wise, and he starts a loop, barrel roll and winds up with a tail spin right off the roof hangar. Finally my prayers were answered and we landed, thanked him for the hop, and expressed my appreciation as best I could, at the same time making a bee line for the back of the hangar, where I would be obscure from the admiring glances a second lieutenant is entitled to.

Well, sir, even at that, that ride did the trick, and after my tour was over, Anthony Bitetti and myself, formed and organized the Aero Club of Richmond.

I had sold a car to Chas. L. Covell, a reporter on a local newspaper so we got publicity and I don't mean maybe, and after a couple of meetings we got Heywang and Hill from the ASPA down to straighten us out because we certainly were up in the air, we found a LeRhone motor, built some models, bought a couple of props and made an old dance hall into a Club house.

Well, today, we have with us, two active flying officers, Lieutenant Battle, of Miller Field, and Lieutenant Kolpien, of the U. S. N. R., as well as all the mechanics of the 27th Div. Air Service as members.

Our Honorary Members consist of G. M. Bellanca, I believe, you heard of him before, Congressman Prall, of our district, Major G. A. Vaughn, a famous war ace, and C. O. of the 27th Air Service, Miller Field, and a prominent Staten Islander architect, Daniel Santoro.

Our membership today since starting November 11th last, is 74 paid up members, we have placed a deposit on a Jenny only yesterday and we are to take delivery on March 15th, a few days after our big Ball and Entertainment given by this outfit.

A cadet group of ten members are undergoing actual flight instruction, while the other members are distributed in motor and rigging classes, which are given every night by the club instructors (I meant every Friday night). As the members of the Cadet Group either qualify or are disqualified the next in order fills the vacancy.

We have our own flying field on Staten Island, the use of which has been given us by enthusiastic well wishers as well as a private office for the conduct of our affairs and meetings of the Board.

So what started off and what is now, I will have to owe to that first wild hop, and too much cannot be said of Tom Hill and Jack Heywang of the ASPA. B. Perricone, Pres.

Another Brooklyn Club

One of the most enthusiastic aero club organization meetings was held in P. S. 15, Brooklyn, N. Y., January 5th. Over three hundred gathered answering a call from Mr. Victor Johannson, and Mr. Frank Flohrs of the temporary organization committee. Plans for a permanent organization and the purchase or rental of a plane were formed; election of officers will be held at the next meeting. Support has been promised by the best interests of Brooklyn and it is expected that the club will be one of the outstanding aero units of America within a short time.

Boeing Acquires P. A. T.

A MERGER of particular interest to the traveling public of the West Coast took place recently when the Boeing Air Transport acquired a controlling interest in the Pacific Air Transport. Both organizations will continue to operate under their original names and there will be little change in either personnel or management.

The officers of the Pacific Air Transport, as newly organized, are: P. G. Johnson, president; A. K. Humphries, vice-president and general manager; C. L. Egtvedt, treasurer, and R. C. Bradshaw, secretary.

The board of directors of the Pacific Air Transport, under the new organization are: W. E. Boeing, president of Boeing Airplane Company, Seattle; Vern G. Gorst, Portland; P. G. Johnson, president of Boeing Air Transport; J. C. Ainsworth, president of United States National Bank, Portland; R. C. Bradshaw, Portland; and Julius Meier, Portland.

The principal advantage to the public of the new line-up of these two operating companies will lie in the increased working capital available for the Pacific Air Transport, a part of which will be used for the purchase of four large planes, designed especially for passenger and mail work, and built by the Boeing Airplane Company at Seattle.

The planes are of the enclosed cabin type, seating six passengers, and will be powered with the Pratt-Whitney "Wasp," developing 425 horsepower. These ships will be built along the same lines as the Boeing planes already in use on the San Francisco-Chicago mail and passenger service, except that they will be larger and more comfortable, and will embody new features, such as the latest in scientific instruments.

When placed in operation the new equipment will give the people of the Pacific Coast states a mail, express and passenger service second to none in the world.

The schedule will remain about the same, except for minor changes that will make the service more convenient for the public. Planes will land at Seattle, Portland, Medford, San Francisco, Oakland, Fresno, Bakersfield and Los Angeles.

This announcement is regarded as of special significance to the West particularly as it involves only home capital from Seattle, Portland, Tacoma, San Francisco and Los Angeles.

By the time the new planes are placed in service it is expected that the Department of Commerce will have completed its survey for night lighting the coast-wise route. The airway between Los Angeles and San Francisco will be fully lighted within a short time, and the route from San Francisco to Seattle will be surveyed and installation of the last beacons and lights begun within ninety days. The lighting equipment will be of advanced type and will represent the highest development of any now in operation.

Construction of the three 12 passenger, tri-motored Boeing planes for the San Francisco-Chicago route is progressing rapidly at the Boeing plant in Seattle. These ships will be ready to go into service about June 1. The cabins of these great liners will have reclining chairs for 12 passengers, buffet service, wash room, electric light, heat and ventilation. The motors are to be Pratt-Whitney "Waps" and develop a total of 1275 horsepower. Two of them will fly the ship.

The route, 1,918 miles in length, will be covered in 21 hours each way, maintaining an average speed of 100 miles per hour. Operations will start with week-end sailings from both Chicago and San Francisco, with additional service added as traffic increases. The present equipment will be used for service on the other days of the week.

Fairchild Aviation Fellowship

A $3,000 yearly fellowship which will be given to a graduate of the Daniel Guggenheim School of Aeronautics for the purpose of research on air-cooled engines has been accepted by the Council of New York University, as the gift of Sherman M. Fairchild, Esp., head of the Fairchild Aviation Corporation and a member of the Advisory Board of the Daniel Guggenheim School of Aeronautics.

The proposed fellowship will cover two years of work and will be first awarded in September, 1928. The recipient will receive a total of $6,000, which will be divided between his personal expenses and the actual experimental research.

In offering this fellowship in the interest of research work on air-cooled engines, Mr. Fairchild explained:

"I feel that this is a very important matter of research, for the reason that we thoroughly believe that the air-cooled engine will eventually displace the water-cooled engine, and the matter is one of correlating aerodynamics and thermodynamics. I feel that such an important subject as this is worthy of support and that it could not be more ably fostered than under the supervision of the Daniel Guggenheim Aeronautical School of New York University.

"It is the privilege of the student receiving the fellowship to teach at certain periods, but to confine the greater part of his time to research work."

The New ANZANI

For the Small Plane

Radial-Air Cooled

THE new ANZANI Engine merits the first consideration of makers, pilots and owners of small and medium sized planes for sport and commercial use. The basic soundness of their improved design, their remarkable simplicity of construction, their perfection of material and workmanship establishes an entirely new standard of economical and dependable operation for all requirements from 18 to 120 h.p. For nineteen years the ANZANI Engines have held world-wide leadership. In the new improved models, constructed especially for American needs under the personal direction of Mr. H. L. Brownback, more power and a finer performance has been achieved without any increase in weight.

New-Series Features

1. Larger Valves.
2. Side by side Push Rods and Cams.
3. Heavier Rocker Arms and Rocker Arm Mount.
4. Greasers on Rocker Arm Pins.
5. Stronger Pistons and oil drainback holes in piston.
6. High compression.
7. Improved Thrust Bearings.
8. Radial Ball Bearing to carry Propeller Load.
9. Double Oil Pumps—Pressure and Scavenge with Filter.
10. Oil Slingers on all Shafts to Prevent Leakage.
11. Latest type Ignition.
12. Bigger Breathers.

" . . . One hundred hour tests have shown the ANZANI Motor to be exceptionally air-worthy and economical. It has been improved in every particular to the use of ordinary fuel and lubricants. . . ." From the current catalogue of the Cessna Air-Craft Company of Wichita, Kansas.

Early deliveries of the new ANZANI Engine may now be scheduled. For prices and further details, write, stating your needs to

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Fairchild Cabin Monoplane

(*Continued from page 40*)

boo strips. Use only the outer portion of the bamboo. (All strips should have one side which was on the outside of the bamboo pole. Throw the rest away as it is not good enough.)

The four lengthwise body strips (longerous) are $\frac{1}{16}$" square in front of the rear edge of the wing and taper to $\frac{1}{32}$" square at the tail. The rear body struts are $\frac{1}{32}$" square bamboo. The body struts at the wing and landing gear portion should be 3/64"x$\frac{3}{32}$". The body does not take any of the strains of the rubber so make it just strong enough to handle and carry without breaking. All of the joints are glued with ambroid. The rudder and elevator are of bamboo, bent to the shape shown. The elevator must be braced with a light bamboo strut. Give the rudder the slight bend as shown. The bamboo can be bent by holding it against a heated electric soldering iron or close to a candle flame. Keep the tail as light as possible. The landing chassis is a group of streamlined bamboo struts $\frac{1}{16}$"x$\frac{3}{32}$", heavily ambroided. (Two coats.)

Now for the front end. The nose should be made detachable to have something to hold onto while winding the motors. Mr. Morris' model comes apart just in front of the front windows. To wind with an egg beater, the motor must be removed. Two dress snaps and two little wire hooks are used for attaching the nose. The nose jumps into place with a businesslike snap, all ready for the launching. A set of nine dummy cylinders can be attached around the nose. The front of this nose piece is a ring of balsa with a hole for the motor stick. A pin through the dummy balsa manifolds holds the motor base from moving forward or backward while two "w" clips hold the motor base in the center of the fuselage. (See the drawing.) The nose wants to be heavier than the tail for several reasons. It takes the blows on landing. The short nose has to balance the long tail. The machine is handled considerably by the nose.

The wheels can be made of drawing paper cones, 2¾" in diameter, but it will repay you many times to make or buy balsa wheels. These can best be made by using a sharp v-shape tool and coarse sandpaper and spinning them out on a lathe or fair sized electric motor. (See drawing.) A little silver paint and black lacquor will make a realistic wheel. For lightness they can be hollowed out and the flat side covered with a drawing paper disc. Two brass washers ambroided on the inside of each wheel make good bearings for the bank pin axles. Study the drawing and you will have no trouble with the landing gear.

NOSE AND MOTOR STICK

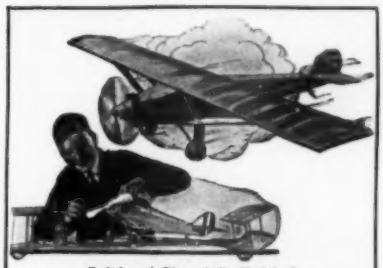
The $\frac{7}{32}$"x$\frac{7}{16}$"x14" motor stick should have several coats of heavy banana oil. Fasten the hook, can, and bearing on securely with ambroid. Fit it into the nose piece and see that the bearing will let the propeller spin with clearance to prevent its striking the nose. Then pierce the hole which is used to pin the motor stick in place. (See drawing.) Simple enough!

The propeller is carved to a Wright shape to assure a true pitch before rounding the ends. Leave the blades wide if you wish long flights. The blank is 8" long, ¾" thick, and 1¾" wide, giving $(8 \times 3.1416 \times 0.75 \div 1.75) = 10.77$" pitch, or practically 11" pitch. The shaft is No. 14 music wire cemented in place. A spinner or pointed nose can either be carved onto the propeller or stuck in place afterwards. The spinner doesn't have to be very large.

THE WINGS

Make a set of ribs like the full sized pattern. You will need 10 of these. Drill holes for lightness between the holes for the beams. To get the ribs all alike it is a good plan to use a thin metal pattern as a guide to cut around. A broken Gillette razor blade is handy to cut ribs with.

The wing beams are set on edge and are $\frac{3}{32}$"x¼" balsa doped with two coats of heavy banana oil for stiffness. The entering edge and trailing edge as the tips are of bamboo 3/64" in diameter. The wings are made in two parts, one left and one right. We are now to make the junction of the wings and the body. There are three good methods. One is to make the wing extend all of the way across in one piece and fasten it tightly to the body. Another is to make the wing in one piece but detachable from the body. A third



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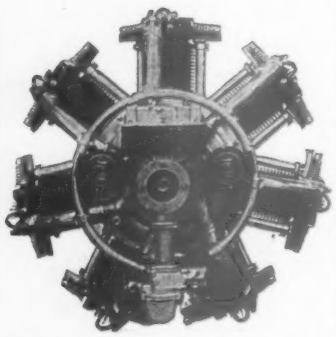

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way is to make the center part of the wing fastened to the body and the left and right portions of the wing detachable. Take your choice. (See drawing and pictures.) Be sure that the right hand wing (from the front) has a bit more angle of incidence than the left side to counteract the torque. Also, be careful to have the main wing set at its proper angle of incidence to the tail. About 2½° dihedral will help the flying qualities of your model.

Send us a snapshot of your model as we would like to see who makes the neatest and best flying Fairchild model.

SUMMARY

The triangular body at the rear makes a strong yet light construction. It was used in the early days. Several Italian ships during the World War used it to advantage. It gives the Fairchild distinctive lines. You can add dummy cylinders, dummy shock absorber cases, movable ailerons and doors that open. This all adds to the weight. The complete model should weigh less than 2¼ ounces. Mr. Morris' weighed 1⅞ ounces.

The larger propeller was used to obtain the necessary traction to fly the model. For display, a smaller true scale size propeller should be substituted, about 6½" in diameter with narrow blades. (See pictures of large plane.)

The wings can be made to come off as shown in the drawings. Either of these methods are very handy as they enable the model to be disassembled and carried easily. Mr. Morris tried both and both worked well for him, so it is a fifty-fifty choice if you wish to have the wings removable.

Assemble the motor unit and give the rubber about sixty turns. (An "eggbeater" winder is a help here.) Fasten the motor in place and examine the wing to see that the right side has a little more incidence than the left to overcome the propeller torque. See that the rudder is bent as shown in the drawings.

See that you have plenty of room for the model to fly in. THEN HAND LAUNCH IT EASILY, ON AN EVEN KEEL WITH JUST A VERY GENTLE TOSS FORWARD. Watch this trial very closely as it gives the clew to perfect adjustments for a much longer flight.

If the model flies in an even circle to the left, and without waving up and down or dropping the inside wing and nosing down, you have a good adjustment to start with.

But if it climbs sharply and waves up and down, it is tail heavy and needs weight on the nose, or still better, bend the elevators down slightly and give it another trial.

If the inside wing, or right wing from the front, drops and the plane noses down, give the rights side of the wing a little more angle, and try again.

You will soon find the adjustment and then you can wind the motor up 125 turns or even 150 turns. (With an "eggbeater" winder, the rubber will stand 300 turns if it is stretched out two or three times its length at the beginning of winding. Then, gradually move in so that the motor is about its correct length when the 300 turns are all wound in.

You should provide a good box to carry the model in as it keeps the model from being broken and prevents paper punctures.

Watch for the model to be described next month! It is just what you have been looking for, a fine model for Spring!

Model Club News

Champaign, Illinois, is active in model airplane circles. January 14th a contest was held in the University Armory. There were thirty contestants. The judges, Professor Knight of the University, Major Maxwell Kirby of the Air Service, and Robert Drake, Scout Leader, awarded the winners' cups, watches, ribbons, etc.

Go to it, boys! You should be able to do even better in your next contest, which is scheduled for March 18th, using the plans and light materials which are just recently available to you.

We have had many letters from readers of the Model Section. Here is an interesting one which came in a little while ago from Mr. Cooper in Omega, Saskatchewan. In part, it reads: "I do hope that you will carry on with the very interesting model section of *Popular Aviation*. Model flying is a very fascinating game and your articles are particularly illuminating. The young aeronautical engineer learns the principles of aircraft from the construction and flying of his own model craft far more thoroughly than he can from any book or lecture,

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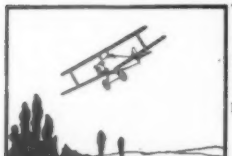

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etc." You are quite right, Mr. Cooper, and you see we are doing our bit.

The Peru Miniature Plane Fliers held their second contest for ten-inch planes January 10. Cecil Clingamon won the first prize, a subscription to *Popular Aviation* with a pretty R. O. G. (rise off of the floor) flight. Mr. Morgan won some model making material for second place. The Peru boys are starting on their second plane, an Indoor Scout Model.

Model fans living near these Clubs should get in touch with them. Let us hear from some more clubs as this is your section.

Form a Club

If you have not already done so you are missing a very good chance to learn more about models and aviation. A club can be made well worth the while of its organizers and members. You can profit by each other's ideas and learn rapidly. Indeed there will soon be new ideas which *Popular Aviation* has not yet discussed. It is interesting to see how many of the existing clubs have grown and advanced new ideas and forged to commanding positions in National Model circles.

Join a club in your locality or start one yourself. Many have done so with gratifying results. Here are a few suggestions which will enable you to get started with your club right away.

It is an easy matter to get a group of from ten to thirty-five together. Colleges, Boy Scouts, manual training classes, etc., will supply the members of your club. Have a little get-together and discuss matters. Hold an election. Be sure the members are all interested in models and intend to build them.

Arrange for a centrally located permanent meeting place where all can meet, say once a week or twice a month. It is advisable to get a place where indoor flights can be made with small models.

Some local aviator or Scout Master, manual training teacher or some air-minded adult should be interested and secured as an advisor and attend the meetings.

Adopt a constitution like the one suggested at the end of this article or use it directly. Set a fee for joining the club (50 cents to 75 cents) and a small fee for each meeting (5 cents or 10 cents). You will need some money for meeting notice cards, materials to

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Black leather wool lined 36" coat $18.00. Leather jacket (no collar) dark wool lined $12.50 or Jersey lined $13.75. Sheepline moccasins for wearing over shoes $5.50. Face mask, wide-vision goggle for cold weather $3.50. Leather face mask only, $2.00. Sweater face mask 75c. Black leather gauntlets fully lamb lined, full mitt with wrist strap $5.00. Wool lined, black leather gloves $2.75.

Gold wings with vertical propeller for wearing on coat lapel $1.00. Winter flying suit, wool lined with hookless fasteners $29.50, or sheeplined, specially high grade with hookless fasteners, $60.00. Dandy fur lined flying suit with hookless fasteners $75.00 Beaverized sheeplined leather helmets $6.00. Chamois lined leather helmets $5.50 or corduroy lined $3.75.

Luxor No. 5 goggle $7.50. Luxor No. 6 wide-vision, curved lenses goggle $9.75. Protector goggles, wide-vision, curved lenses $6.50. Italian goggletle $3.50. The following are non-shatterable goggles: NAK, chenille padded $4.00. DG, extra heavy chenille padded $4.50. RAV, rubber bound $4.50. Goggles just named are all wide-vision type. Jumbo oval, chenille padded $2.50.

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distribute and sell to the members, perhaps a stop watch to time contests accurately, and of course a club subscription to *Popular Aviation* for the members to use as a hand-book of aviation and models.

After the business is handled at the meetings, the construction of a model should be begun. Use some easy model such as the Scout Model to start with. In three or four weeks arrange a small preliminary contest with a few small prizes such as an Ingersoll watch, a subscription to *Popular Aviation*, or a can of ambroid or other model supplies. Urge the members to have their models completed early enough before the contest that they can give them trial flights and find the setting of the wings, etc.

The local paper will be glad to print an announcement before the contest and also to print a story of the contest and results after it is over with. In this way you can get more boys interested in this instructive work.

Your club members will have made their models fly very well by this time and it will be an easy matter to get interest in your club from the Chamber of Commerce, Kiwanis, Rotary Club. You can even give a demonstration at some of their meetings. Each of them or some one surely will be only too glad to furnish prizes for your local contests and to supply funds for sending one or several winners of your local contests to State and National Model Airplane Contests, which are held from time to time. Some of these men will be glad to act as officials in your contest.

A model in a store window is always a means of drawing a crowd. The merchants will help you if you go to them in the proper way.

Popular Aviation will be glad to give suggestions to your club at any time. Keep a complete file of *Popular Aviations* at your Club for reference.

If you construct the models described in the model section of *Popular Aviation* you will learn all of the best and latest in model airplanes. These models fly better and are simpler to build than most of the models described in any magazine or book heretofore.

Here is a model constitution to follow in formulating a constitution for your new club:

Article I.

Name. This organization shall be known as .....

Article II.

Object. The object of this organization is to study aviation through the construction and flying of various types of models.

Article III.

Membership. The membership to one group club shall not exceed forty regularly. (Form two groups.) The members must be over ..... years of age. (Fourteen years is a good limit, but exceptions can be made where a younger boy has made a good flying model before joining the club.) A member must be elected to that position by a majority vote of the members at any regularly scheduled meeting.

Article IV.

Officers. This organization shall have a President, Vice President, Secretary, Treasurer, Contest Manager (who also acts as Sergeant at Arms at business meetings), and an advisor. Every six months these offices should be elected by a majority vote present at a regular meeting. Members who hold world's records and advisors are to be honorary members with a vote if they desire.

Aricle V.

Officers' Duties. Section 1. The President shall conduct the meetings.

Section 2. In the absence of the President, the Vice President shall conduct the meetings.

Section 3. The Secretary shall keep a record of the proceedings of the Club meetings and handle the correspondence.

Section 4. The Treasurer shall keep the financial record for the Club, showing all money received, spent, and on hand. He shall pay only such sums as are authorized by the Club as a whole and upon the written order of the President.

Section 5. The Contest Manager (and his committee) shall arrange for all contest rules, judging, publicity, prizes, and report each meeting of his accomplishments. He shall assist in keeping order at meetings. (You need a good man for this job, too.)

Section 6. The advisor is expected to attend the meetings and assist the Club in any way he can.

Article VI.

Meetings. The Club shall hold meetings..... Special meetings can be arranged if notice is sent to all members two days in advance.

Article VII.

Dues. The initial fee to join the Club shall be ..... The dues per meeting shall be .....

Article VIII.

The meetings shall be conducted along standard lines as recommended in Roberts' book or Cushing's book.

Article IX.

Amendments. This constitution may be altered by a two-thirds vote of the members present only when the amendment has been read at the meeting previous.

Detroit Aircraft Show

The All-American Aircraft Show, for the season of 1928, will be staged in Detroit, according to announcement made by Ray Cooper, director of the National Air Tour for the Edsel B. Ford trophy. The Exhibition will take place April 14-21, under auspices of the Detroit Board of Commerce, and will be managed by Mr. Cooper.

The Aeronautical Chamber of Commerce of America has given its official sanction to the show, which will exhibit the latest productions of aircraft manufacturers. The Chamber has dispatched "Smiling Jack" Harding to Detroit to act as their representative and co-operate with Mr. Cooper in setting the stage. Mr. Harding was an engineering officer of the famous army "Round-the-World" flight.

Convention Hall, with its floor area of 166,000 feet, has been selected as the setting for the national exhibit. Manufacturers of aircraft, parts, and equipment have been invited by the Board of Commerce to participate in the show, and early returns indicate that the space will be entirely taken up within the next 30 days. Manufacturers who do not hold a membership in the national Aeronautical Chamber will be accorded the same privileges as members.

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By Lt. Cdr. F. W. Wead, U. S. N.

DURING the year 1927 more trans-oceanic flights were attempted and completed than in all previous years put together. In the great enthusiasm that has surrounded these splendid achievements, and the sorrow that has attended concurrent failures, we are very apt to overlook vital lessons learned by the predecessors of Lindbergh, Chamberlain, Byrd, Goebel, and others. Prior to Lindbergh's flight to Paris boat-seaplanes had been used exclusively in trans-oceanic flying. His success initiated the use of landplanes for such flights, for the very simple reason that few, if any, existing seaplanes, or at least any within the procurement of the pilots concerned, had the flying range necessary for the flights attempted. It seems unnecessary to point out that an airplane cannot carry a boat hull weighing several hundred pounds more than a wheel landing gear and also carry as much fuel as it can as a landplane. Commercial air transport in the U. S. requires aircraft of the land type and it is therefore this type that our factories have developed. Even in the Navy the development of seaplanes has been secondary to the development of landplanes suitable for carrier use. Naval landplanes operating from the carrier *Langley* have occasionally been forced to land in the water, and past experience shows that they sink in about *five minutes,* and devices to prolong this flotation cannot as yet be said to be entirely satisfactory. Is it any wonder that almost every landplane that has unsuccessfully attempted a trans-oceanic flight has been a total loss?

No personel, till then, had been lost in trans-oceanic flights in seaplanes of the boat type, and yet such attempts have been less successful than similar ones in landplanes. In 1919 three NC boats attempted to fly the Atlantic. On the flight from Trepassy to the Azores two were forced down; one taxied several hundred miles into port under its own power; the other floated easily until the crew was picked off by a steamer. Portugese aviators completed a seaplane flight to St. Paul's Rocks and across the South Atlantic under circumstances that would have spelled disaster for a landplane. De Pinedo was forced down at sea several hundred miles from the Azores, was towed into port, made repairs and completed his scheduled route. Locatelli, who attempted to fly with our around-the-world flyers, drifted around the ice-dotted North Atlantic for days before he was finally picked up. Leigh Wade, a member of the same Army Around-the-World Flight, probably gave out hearty thanks for the clumsy and heavy pontoons under his Douglas World Cruiser when he went down between Scotland and Iceland. If any further argument is needed that future trans-oceanic air-liners will be boat seaplanes we have only to point to Cdr. Rodger's attempted flight to Honolulu in 1925.

Two PN-9 Navy seaplanes started on this flight. One of them, the PN-9 No. 3, was forced down and promptly towed into port after flying some 300 miles. Cdr. Rodgers in the PN-9 No. 1 flew about 1,800 miles and was finally forced to land out of gas. Owing to low visibility and a mistaken radio bearing he turned North to find a ship (the *Aroostook*) that was actually South of him. This error threw all search operations too far to the Southward. Upon landing Cdr. Rodgers started a small still which he carried, making drinkable water out of sea water, rigged sideboards to counteract leeway, and with the wings as sails proceeded to sail his plane towards Kaui, the nearest land. His radio set permitted reception but not sending on the water, a defect that has since been remedied. For nine days he and his crew of four sailed calmly along, intercepting the search messages between ships to the South of them, and expecting any moment to be picked up. With land in sight they were taken in tow by a submarine. And the only time that Cdr. Rodgers or his crew were unduly alarmed was when a message was intercepted stating that: "Twenty-one aviators on the Langley agreed that his plane must have crashed on landing," a very natural conclusion under the circumstances. Those who know the Pacific know that it belies its name as far as seaplanes are concerned. The water during the surface part of Cdr. Rodgers' flight was not smooth, and, of course, it was not stormy.

Another common misconception exists in regard to multi-engined planes. No multi-engined plane has yet been built that will fly with full load with one engine dead. As the load decreases and such planes become lighter through burning fuel in the engines they may become sufficiently lightened to enable them to maintain altitude with one engine out. And in any event the glide is greatly lengthened in the case of a

forced landing in the multi-engined type, making for safety if forced down near ships or in rough water. Trans-oceanic air-liners will unquestionably be multi-engined types.

In a recent article in the Atlantic Monthly Lt. Cdr. Leighton points out that in every airplane the limiting load factor is pounds per horsepower. When the total weight of the airplane—crew, fuel, engines, structure, everything—exceeds 25 pounds per horsepower the plane will barely (and it may not) leave the ground. This applies to all airplanes, all types. It indicates conclusively that further improvements in design must be effected to reduce the fixed weights of aircraft —that engines and structure must weigh less than they now do—before they can carry fuel and passengers and mail or freight *and a boat hull* over trans-oceanic distances. These improvements can be made and will be made, not ten years from now, not in some far-distanced Utopia, but in the immediate future. After such aircraft have been developed further time will elapse before regular trans-oceanic air lines are operating on schedule.

The development of air navigation or avigation as it is coming to be called has not kept pace with the development of aircraft. This is only natural, as by far the greater part of flying has been done over land where a pilot can recognize his position at a glance and where practically no avigation is required. Every trans-oceanic air liner, however, will carry an experienced avigator who will run dead reckoning by determining his drift at short regular intervals, checking in with the radio beacons where possible and taking celestial observations when conditions are suitable for them. It may be said, however, that at present it appears that dead reckoning is infinitely more important to aircraft than is celestial aviation, and that present air sextants and astronomical methods must be considerably improved before they will be satisfactory for aircraft use. Trans-oceanic aircraft must have accurate wind forecasts to insure that head winds will not prevent them from reaching their destination and to aid in avigation. Radio installations must permit the reception of radio beacon bearings, and of route and weather information in flight, and transmission in the air and on the water.

In order to draw up a suitable weather chart from which forecasts may be made over long trans-oceanic airways it is vital that weather reports be obtained from every possible point within the area through which the airway passes. This involves a more complicated system of weather reports from ships at sea and from outlying islands than now exists. And with the best possible forecast local disturbances will always have to be met and overcome. We know little of the upper air. Selection of favorable high altitude routes and such matters as fog dispersal at terminals are other items that trans-oceanic air lines will develop or follow.

Comfortable enclosed cabins, sleeping berths, air-cushioned lounging chairs, sound-proofing, meals—they will all be found in the coming multi-engine boat seaplane trans-oceanic air-liner. It is true that this development will take time. It is true that it may be preceded by combined ship and airplane services saving a day in crossing oceans. It is equally true that its coming is inevitable—as inevitable as the network of air transport lines now spreading itself over the United States.

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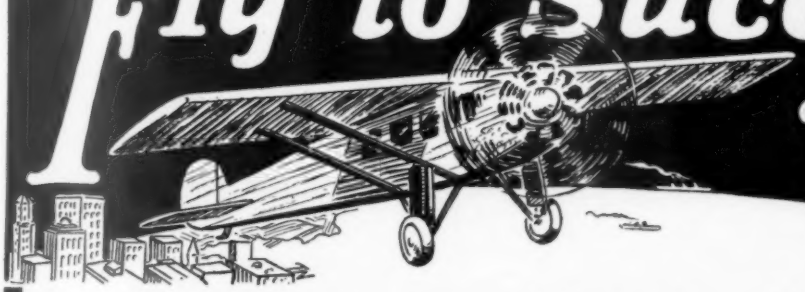

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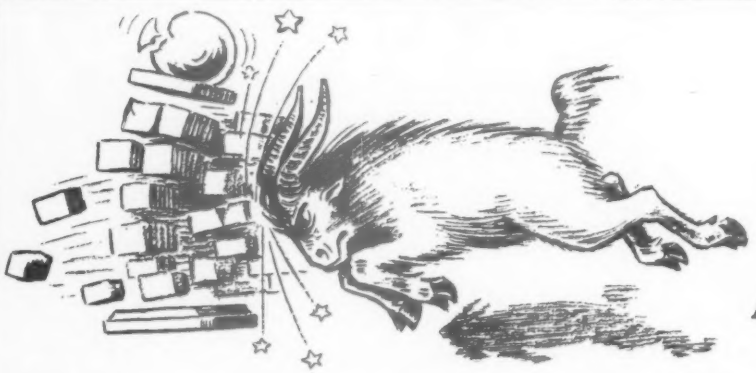

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New Aviation Oil

The Texas Pacific Coal & Oil Company have announced the completion of rigorous tests on their new product, A-M-L-O (Aviation Motor Lubricating Oil) which they believe indicate that a new standard for lubrication has been set. The original laboratory work of the company was based on the theory that a paraffine base oil was better suited for aviation work than oils refined from asphalt or napthene bases. By refining their oil from a paraffine base and by means of special equipment rendering it absolutely wax-free they have arrived at a product that can be used in any season, even in zero weather. One of the claims made for the oil is that it lasts a third longer than other automobile and tractor oils now used for aviation engines.

South Seas Achievement

The first notable achievement in 1928 aviation history was enacted in the far off south seas according to Central News dispatches from Wellington, New Zealand, when Capt. Hood and Lieut. Moncrieff, flying a Ryan Brougham sister-ship of Col. Chas. Lindbergh's "Spirit of St. Louis" flew non-stop from Richmond, Australia, to Wellington, New Zealand, a distance of over 1,250 miles by water in 13 hours, bucking a head wind and encountering fog near New Zealand.

The ship .time between the two countries is six and one-half days and this flight is a forerunner of a regular passenger mail and air express service between Sydney, Melbourne and Wellington, according to information from Wellington.

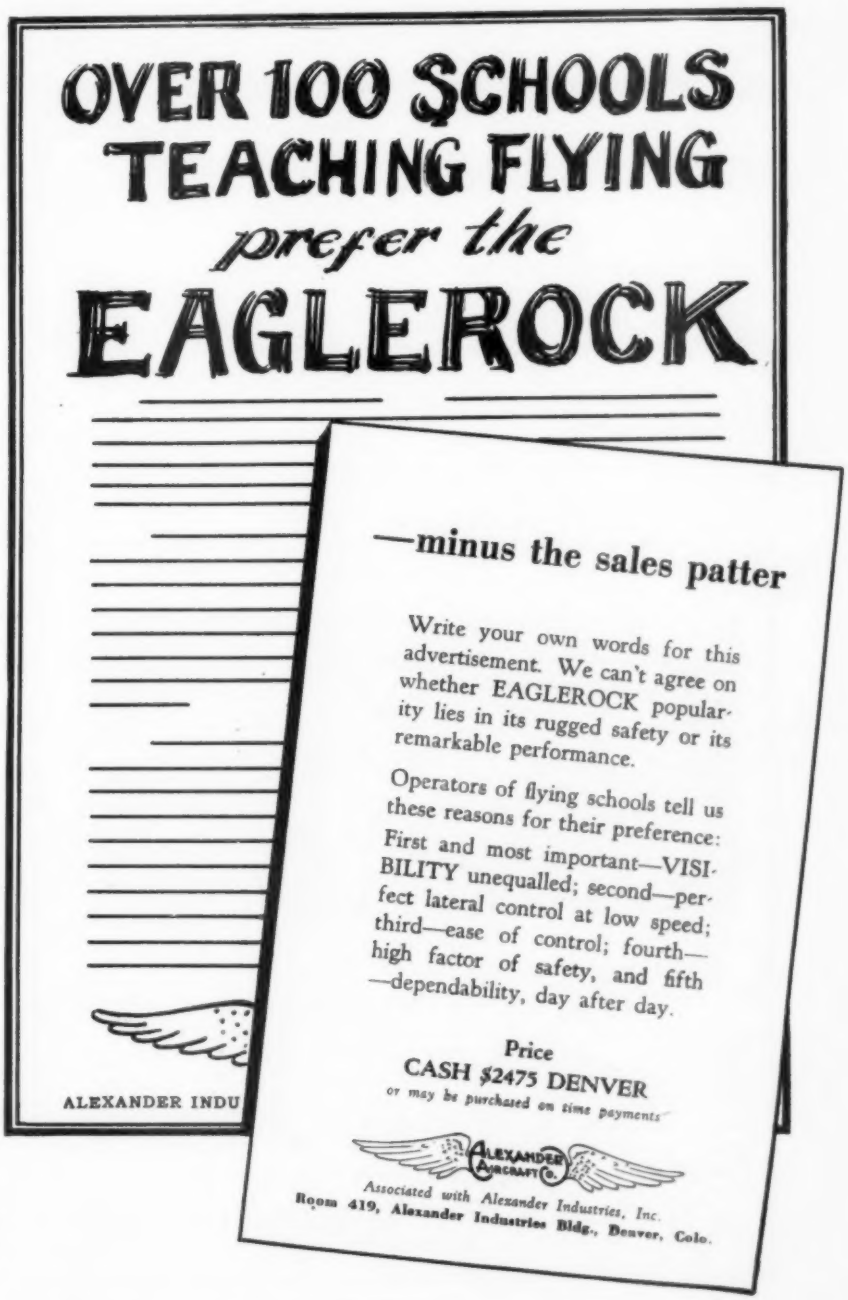
The plane used was a standard Ryan Brougham with an extra gas tank behind the pilot and room for express and two additional passengers. It had a cruising range of 2,500 miles.

Advance Has Sales Meeting

The Advance Aircraft Company, manufacturers of the Waco, recently held a meeting of their distributors at Troy, Ohio. The meeting was called for the purpose of discussing experiences of 1927 and planning ways and means of meeting the various problems of 1928. It soon developed that the sales possibilities of the distributors were limited by the factory output, and that those who wished to make a showing would have to lay in a stock of planes early in the year.

The factory organization revealed its plans to build five planes per day for the first sixty days of the new year and to increase production as rapidly as facilities could be added without a lessening of the quality on which the reputation of the firm has been built.

The close of the meeting saw the entire estimated output for 1928 sold to the distributors. The Advance Company has announced that Siemens radial motors will be used in large quantities on their new production ships, and that other motors of similar type will be used as fast as their performance can be tested and production assured.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Yes, But Have You Heard—

THAT Eddie Stinson made the trip from Chicago to Tampa in 8 hours, non-stop, a distance of 1,000 miles?

THAT a new Texas line will make connection with the N. A. T. at Fort Worth, serving Dallas, Houston, Galveston, Waco, Austin and San Antonio?

THAT Captain H. C. Major of the Marine Corps rescued a party of duck hunters on the eastern shore of Maryland, when they were snowbound in twelve-foot drifts, by flying to them?

THAT Clarence Chamberlin is making a lecture tour of the Eastern Atlantic states, flying in his tiny sport plane?

THAT the Culver Company, realtors of Culver City, Calif., are going to use two cabin planes for showing prospects their properties?

THAT Rear Admiral Moffett, chief of the naval bureau of aeronautics, wants five more aircraft carriers for the navy?

THAT the Navy has ordered forty-one additional Vought Corsairs for duty with the battleship fleet?

THAT radio phones were employed in giving orders from the ground to nine armyplanes going through battle maneuvers over Mitchel Field?

THAT Lindbergh's book, "We," has been published in Braille, for the use of the blind?

THAT Lieut. John Harding, Jr., is now field contact man for the Aeronautical Chamber of Commerce?

THAT the newly formed Minnesota Aircraft Company at Minneapolis is distributor for Alexander Eaglerocks in Minnesota.

THAT the Cackle Corner Poultry Farm at Garrettsville, Ohio, is complaining to the postmaster general that the mail planes are worrying his hens into low egg production?

THAT Isleton, California, boasts a flying club with practically every able-bodied male resident of the town on its roster?

THAT the Bellanca Corporation has acquired land for an airport and manufacturing plant six miles south of Wilmington, Del.?

THAT Universal Air Service, formerly of Blackwell, is now located at Bartlesville, Okla., on its new field, where it will be distributors of Lincoln-Page planes?

THAT American manufacturing rights have been obtained on Avro "Avians" by H. J. Taplin of Spokane, Wash.?

THAT St. Louis has announced the removal to St. Louis of the B. F. Mahoney Aircraft Corporation, builders of the Brougham Lindbergh made famous?

THAT Blood & Forster, operating under Atlantic Airways, are new dealers for Eaglerocks in Kingston, N. Y.?

THAT the American Aircraft Company, Los Angeles, is now running

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sight-seeing trips to San Diego and San Francisco, using Fairchild monoplanes?

THAT a hundred Falcons are under construction at the Buffalo plant of the Curtiss Aeroplane & Motor Company for the army?

THAT the big dirigible, Los Angeles, landed on the deck of the airplane carrier, Saratoga, as a test?

THAT the government has signified its willingness to take any proper steps necessary to assist the proposed international air line using dirigibles?

THAT there is a rumor that Goodyear will establish a factory for building light-than-air craft near Los Angeles?

THAT France is about to open a combined air and water, plane and boat, mail service to South America, cutting the time nearly in half?

THAT Count Georg von Solms-Laubach says he will make another try at a flight from Germany to the United States?

Radio Communication

POPULAR AVIATION has received several interesting letters from radio fans relative to the tests made with radio phone communication for airplane use. One of the interesting letters is from M. L. Dobler, of Baltimore, Md. Sections of Mr. Dobler's letters may be of interest to those who are fascinated by the application of the two latest scientific developments.

"It seems to me that more use of the radio-phone could be made than has been made lately, and my log of the conversations from ship to land during the radio beacon tests, will demonstrate how clearly a good phone set can function on a plane travelling about 90 miles an hour.

"One Saturday afternoon, chancing to go around the board on my radio receiving set, and not content to remain within the lower wave lengths, but to go higher and see if anything unusual was going on, I was rewarded by noting a strong carrier wave signal about 535 meters.

"Listening carefully I was thrilled to hear the Department of Commerce plane M-2, en route from Logan Field, Baltimore, to Bolling Field, Washington, in conversation with the Department of Standards land station throughout the whole of the 40 mile trip.

"To show how clearly the conversation was received, my set is a small portable Radiola II, and the conversation was received on the detector plug alone.

3:46 p. m. College Park: "Hello Grove, Hello Grove."

3:47 p. m. Plane M-2: Am now using high quality microphone—O.K. —go ahead."

3:50 p. m. Plane M-2: "Am only using half of my antenna."

3:53 p. m. Plane M-2: "Now passing Camp Meade." Signal strength very good, modulation quite clear.

3:58 p. m. Plane M-2 quite distinct.

3:59 p. m. Plane M-2: "Received O.K., standing by for further orders. Think you said something about antenna."

4:02 p. m. Plane M-2: "Now over College Park." Engine noise quite pronounced.

4:08 p. m. Plane M-2 to land station 3x2: "Please repeat."

4:12 p. m. Plane M-2: "Now ready

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to land at Bolling Field, Washington."

"On the conclusion of these talks I rushed down stairs and telephoned Mr. Pratt, of the Bureau of Standards at Washington, to tell him of the clearness of the reception and to advise Mr. Grove, the operator on the M-2 as to how his messages were received.

"At 3:46 Mr. Grove, from his ship, spoke to me very clearly. "Hello, Mr. Dobler, hello, Mr. Dobler, many thanks for report, the M-2 is now over Relay, Maryland."

The volume and constancy of this ship's transmitter was uniform throughout the trip, a clear demonstration of how radiophone conversations from airplanes to land stations can be made a success.

Second-Class Air Travel

Second-class air travel at reduced fares has been inaugurated on British and French air lines operating between Paris and London. The principal difference between the first-class and second-class services will be that the latter will have a schedule calling for departures early in the morning, and will use slightly smaller planes. First-class passengers on the French company's line may travel in restaurant planes with the price of luncheon included in their fare, while the second-class passengers will use ordinary planes with a capacity of 10 to 12 persons. The British air line will use three-engine planes for first-class and two-engine planes for second-class service. The second-class fare is $18.50 one way and approximates closely the first-class railroad and boat fare between the two capitals. The first-class fare has been reduced from $30 to $24. The fares have been reduced for the purpose of stimulating passenger traffic.

Italy Attains Third Place

Italy has reached third position in international aerial traffic, being surpassed only by Germany and France. Italy's progress is regarded as somewhat remarkable when it is considered that the principal lines operate both overseas and overland and are operated almost exclusively with hydroplanes.

Furthermore, it is said, few nations have had the land handicaps and obstacles to overcome such as crossing the Alps or Appennines even on short runs.

During 1928 the air lines to be completed are the following: Rome-Milan-Trento-Monaco; Rome-Sardinia; Brindisi-Valona and the Rome-Brindisi, all of which will connect the principal regions and cities with a thoroughly organized system of transportation. Italy is also said to be looking forward to incorporating the Genoa-Barcelona line into a transatlantic line extending from Italy to America.

Brazilian Aviation Congress

Brazil's first Congress of Aviation has been called for July 14 of this year upon the initative of the "Club des Bandeirantes de Brazil" and the "Brazilian Areo Club," national flying clubs.

Organization of the official program of the congress has been completed and will include discussion of landing fields, air traffic, aeronautical technique, plans and aids for advancement of aviation, training of pilots, aviation law and the administrative organization of aviation on a national scale.

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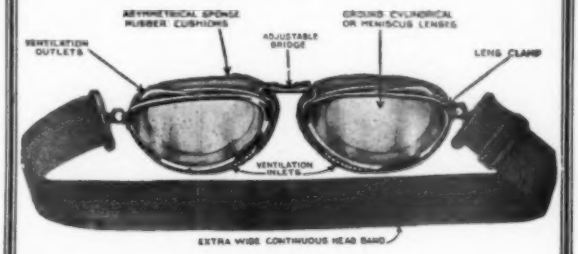

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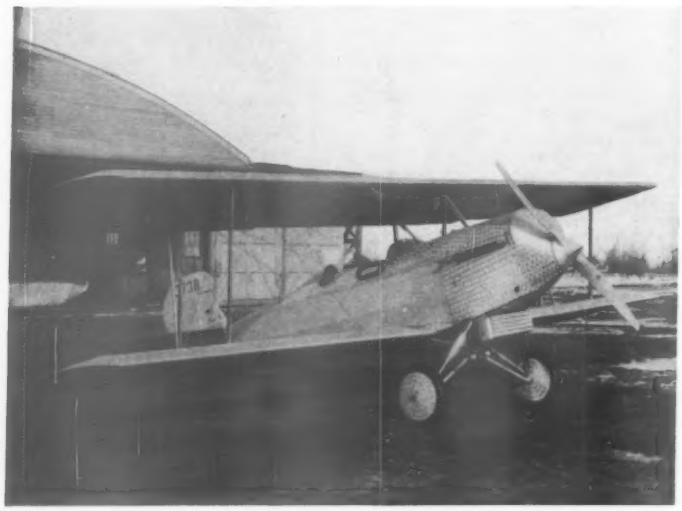

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1928 Air Races

The Contest Committee of the National Aeronautic Association has announced that the National Air Races for 1928 have been awarded to the city of Los Angeles, where they will be conducted under the auspices of the California Air Races Association during the month of September.

The program includes races of representative types of both military and commercial planes. It includes two cross country races, one starting from the Municipal Airport, San Francisco, and the other from the Oakland Airport, with an intermediate control station at the Bakersfield Municipal Airport. The finish will be at Los Angeles. A total of $25,000 in cash prizes has been placed on deposit. The rules and regulations governing the races will be published at an early date.

Aircraft Industries Relocate

Aircraft Industries, Inc., of San Leandro, Calif., have moved into a new factory building at San Leandro, and will not only operate an extensive repair and supply depot but will construct custom-built planes. J. F. Long, formerly with the Douglas Aircraft Company, of Santa Monica, A. R. Wild, connected with industry for nearly twenty years, J. L. Berney, builder of the "Aloha" which took second place in the Dole Race, and Charles L. Henck, formerly of the Army air forces, form the personnel of the company.

Supercharged Hawks Built

With the cooperation of Air Corps engineers, the Curtis Aeroplane and Motor Company has produced a supercharged version of the standard Hawk pursuit plane, and the first plane of this type has been tested at Mitchel Field.

Preliminary tests show that the "Super Hawk," as the new plane is called, has an exceptional performance at high altitudes, and for this reason is expected to prove especially valuable in actual combat. It will also provide an excellent basis of comparison of water-cooled and air-cooled engine performance at altitudes. Air-cooled engines for some time past have been equipped with superchargers, and have thus been enabled to show performances at altitudes which naturally were not matched by unsupercharged water-cooled engines, with the satisfactory development of a supercharger for water-cooled engines, and its installation on the famous Hawk, the Air Corps is enabled to make comparative tests under reasonably similar conditions. While no official figures are available, the Super-Hawk at 20,000 feet, is said to be capable of doing better than 185 miles an hour, and to have a service ceiling in the neighborhood of the present world's altitude record.

The conversion of the standard Hawk to the supercharged type, which bears the Air Corps designation P-5, is made by the installation near the nose of the plane, of a side-type exhaust-driven supercharger. This supercharger regulates the mixture of air and fuel that is supplied to the carburetors and is able to maintain ground level conditions up to twenty thousand feet. The usual tunnel type of radiator is used, but it is somewhat larger than the standard Hawk radiator. In addition, there is an auxiliary radiator mounted just forward of the supercharger, to cool the air as it comes from the supercharger. The engine fuel pump, usually mounted on the crank case, has been lowered and is driven by a flexible shaft.

The Super Hawk is powered with the Curtiss D-12F water-cooled motor.

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More "Double-Tracking"

"Double-tracking" of the skies was materially advanced when National Air Transport inaugurated a daylight passenger air mail and express service between Chicago and Kansas City as well as night service between Chicago and Dallas early in February.

Heretofore double service—day and night—has only been in operation by NAT on the New York-Cleveland-Chicago route. Recently, as a means of speeding up both air mail and express traffic between the southwest and the rest of the country, National Air Transport announced the completion of the lighting on the southwestern route, and that night flying would start between Chicago and Dallas on February 1.

Passenger service was experimentally carried on last September on the Chicago-Dallas route but was discontinued in spite of large patronage to permit of alterations in passenger planes and further engineering tests. Passenger carrying on the Chicago-New York line has been on an emergency basis only. With the beginning of the new Kansas City-Chicago day service, passenger business by air between those cities will be carried on regularly. Passenger carrying will not, however, be added to the night mail and express service.

With double service — day and night—in effect between Chicago and New York and between Chicago and Kansas City, "double tracking" of the airways is promised further impetus by Boeing Air Transport which plans soon to double its service from Chicago to San Francisco. At present this company flies at night only on the eastern end of its line, one plane leaving Chicago each night for the west.

The night flying between Chicago and Kansas City will virtually cut 24 hours from the time of air mail and air express between the southwest and Chicago territory. Heretofore this cargo has lain in the Post Offices on the southwestern end overnight awaiting the early morning plane which arrives in Chicago at night for another layover in the Post Office for morning delivery. By night flying on and after February 1, mail and express made up at the close of the business day will go aboard the evening plane, reaching Chicago early the next morning in time for the first delivery. The same saving is true from the middle west to the southwest, by the use of night service.

Kansas City and Kansas and Missouri users of the air mail and express made insistent demand for day service and the executive committee of National Air Transport finally decided to add the Chicago-Kansas City day planes. This new service, day and night, will give the Kansas City territory the best air service it has ever enjoyed. Colonel Paul Henderson, general manager of National Air Transport, pointed out.

Day planes will leave Chicago at 5:50 A. M. arriving at Kansas City at 11:18 A. M. and will leave Kansas City at 1:57 P. M. and reach the Chicago airport at 7:20 P. M. in time to catch the night plane for New York. The night plane will leave Chicago at 8:00 P. M. reaching Dallas at 8:33 A. M. The other night plane will depart from Dallas at 7:00 P. M. and reach Chicago at 7:30 A. M.

By means of the new day service, a Chicago business man, for instance, may leave in the morning for Kansas City, spend two hours and thirty-nine minutes in conferences there, climb aboard the northbound plane at 1:57 P. M. and reach Chicago the same evening in time for a late dinner.

This entire program of day and night service will tie in with the Chicago lake shore airport and harbor plan, and makes more imperative the early construction of a lake shore landing field.

American Planes in Canada

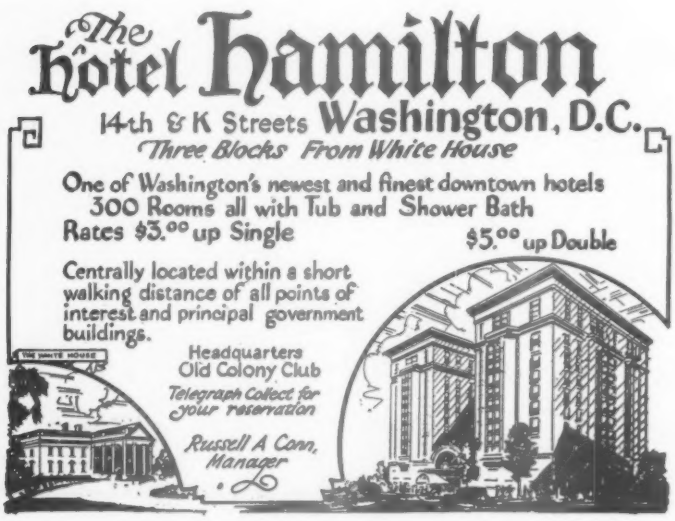
New rules for American aircraft entering Canada have just been drawn up between the American and Canadian governments, according to a statement by the Department of State, issued recently.

The new requirements differ from those made public by the Department on August 8th, in that the pilot is no longer required to give the date of the proposed flight, owners' name and address, pilot's name and various other specifications to the Canadian Air Board in Ottawa to obtain advance permission for the flight. Under the new agreement, the pilot must obtain approval of date, hour and place of first landing only from the collector of National Revenue nearest to the landing field at the point of destination.

The new regulations made public by the Department following in full text:

Requirements to be met by American aircraft entering Canada:

Commerical Aircraft: 1. The aircraft must be registered and passed as airworthy by the United States Department of Commerce, Aeronautics Branch, and must bear the registration markings allotted to it by that branch preceded by the letter "N," placed on it in accordance with the Air Commerce regulations of the Department of Commerce.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2. The pilot must be licensed by the United States Department of Commerce.

3. Before taking off, approval of the date, hour and place of first landing must be secured from the Collector of National Revenue (Collector of customs) at or nearest to the landing field at the point of destination in order that arrangements for customs examination may be made. A list of the Canadian collectors and their stations appears in the annual publication, "The Canadian Almanac."

4. The aircraft must carry aircraft, engine and journey logbooks, and the certificates of registration and airworthiness issued by the United States Department of Commerce. The pilot must have his license in his possession.

5. No photographic apparatus shall be installed in, nor shall any photographs be taken from, any aircraft while operating in or over Canadian territory unless such aircraft is registered in Canada or in another British Dominion, Colony or Possession.

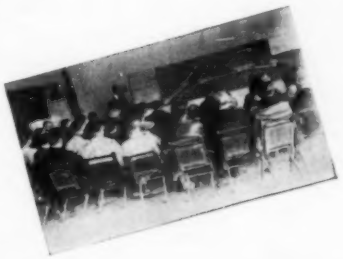
6. American pilots may not engage in commercial aviation in Canada nor may American registered aircraft be employed on such work.

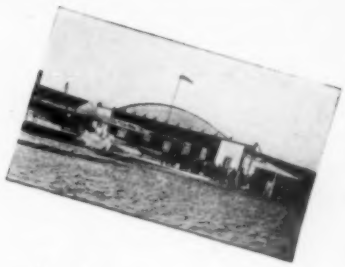
7. If the aircraft and pilot are licensed to carry passengers in the United States they may do so between the United States and Canada or vice versa but not between points in Canada except in the case of through passengers making a landing en route. When passengers are carried in accordance with the preceding the owner or pilot of the aircraft should make arrangements with the Canadian Department of Immigration for their proper entry.

8. Before final departure from Canada the pilot must report to the Canadian Customs.

9. In special circumstances when the above stipulations in regard to entry cannot full be met, the Canadian Department of National Defense should be consulted by persons desiring to make flights over Canadian territory in order that the circumstances may receive further consideration.

10. On returning to the United States, the pilot must report to the nearest United States customs authorities immediately after the first landing. The first landing must be made as near as possible to a United States customs port. A list of United States customs ports appears in the Customhouse Guide. If passengers are carried on the return flight, the pilot is responsible





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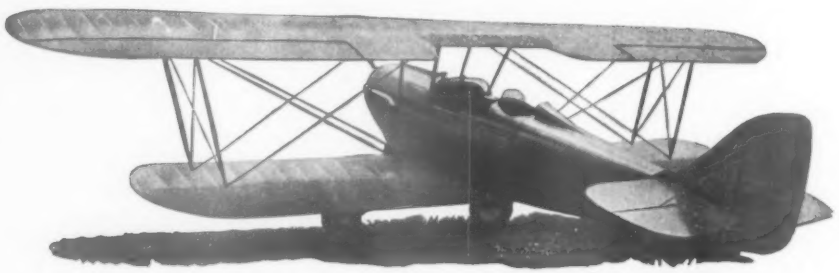

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for their reporting to the immigration authorities, who are to be found at most of the points where there are customs authorities.

Government Aircraft. 1. Army and Navy aircraft are required to obtain permission in advance, through the Department of State, for every flight over Canadian territory. United States Army aircraft have special authorization to pass over Canadian territory without obtaining permission in advance or without reporting each flight, along the north shore of Lake Erie between Selfridge Field, Michigan, and Buffalo, New York.

2. The Canadian Air Regulations provide that "All state aircraft other than military, customs and police aircraft shall be treated as commercial aircraft," and as such shall be subject to the requirements mentioned above for commercial aircraft.

Course in Meteorology

The consensus of expert opinion is that it is even more necessary for an aviator to know the air and its vagaries than for ship navigators to have an acquaintance with the currents of the sea and the movements of the lower air because the airman has the disadvantage of moving in one medium only. He cannot play one off against the other as can the sailor. The tricks that the aviator has to use against the elements in order to accomplish a difficult flight are complicated by this condition.

The requirements in meteorology for a pilot's license are necessarily simple at this stage of the study of aviation. One whose information is confined to the scope of the examination, while he has the beginnings of a knowledge of the air, is likely in any varied flying to come up against conditions that are not even considered in the elementary studies that he has pursued, and he may be obliged to make quick decisions where he should be able to supplement his instinct or "natural horse sense" by a wider outlook and knowledge which is based on more exact information.

Because it has been difficult for aviators to get adequate training in this line, the Daniel Guggenheim School of Aeronautics of New York University, with the Guggenheim Fund's Committee on Aeronautical Meteorology has developed a most complete evening course especially designed to aid pilots, mechanics and company executives. The first class began February 16. The course covers weather and climatic conditions all over the world and lays especial emphasis on the principles that underlie these conditions. The study is under the supervision of J. Edmund Woodman, professor of Geology and director of New York University's Museum of Geology at University Heights.

Dr. Woodman has taught meteorology for twenty years in connection with physical and economic geography. During the war he made special studies of fog and its migration in the North Atlantic, and of other phases of visibility. He has just completed a trip around the world, in the course of which he collected much additional material on the atmospheric peculiarities of many countries, paying special attention to the typhoons of the Western Pacific region.

Professor Woodman plans to use some of the most skillful experts of the country for lectures to the class. It is believed that the experiences of

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the fliers themselves will furnish many of the problems for discussion because even those who have flown even in limited areas have discovered peculiarities of behavior of the air or of the action of their planes through unusual atmospheric conditions.

Professor Woodman doubts if the time will ever come when aviators will be wholly independent of the medium that sustains their flight but in outlining the purpose of the course he says: "The careful flyer will not buck the wind and weather when he can accomplish his aim by delaying passage or by turning aside in a detour. Our 'conquest of nature' consists largely in our ability to 'use' her; to adapt ourselves to her moods rather than to alter them. We can't change the weather, much less the climate. The best we can do is to outwit her, trying whatever is necessary and possible to attain our ends in accordance with her laws. Time, machines and many valuable lives will be saved when aviators pay attention to plain handwriting, not on the wall, but in the sky."

The following list of specialists will be invited to address the class and some have already agreed to do so: Mr. C. G. Rossby, Daniel Guggenheim Fund, Topic: The Polar Front Theory of Weather; Mr. Kimball, New York office of the Weather Bureau, Topic: Weather and Trans-Atlantic Flying; Mr. Thomas H. Chapman, Department of Commerce, Topic: Organization and Future Development of the Airway Meteorological Service; Mr. W. R. Gregg, United States Weather Bureau; Lieutenant F. W. Reichelderfer, Bureau of Aeronautics, Navy Department, Topic: Fog Forecasting and Fog Dissipation Experiments; Mr. C. G. Andrus, Weather Bureau, Hadley Airport, Topic: Demonstration of and Lecture on the Work at a Meteorological Airport Station; Lieutenant Anderson, Lakehurst, N. J., Topic: Lighter Than Air Craft Operations and Weather; Major W. R. Blair, Signal Corps, Topic: The Signal Corps Meteorological Service Now and During the War.

The content of the course includes a study of the features of the atmosphere important in its use as a flying medium; its composition and physical character at various altitudes; changes of temperature and pressure and their results; primary and secondary circulation systems; precipitation in its various forms; weather and its peculiarities; climatic zones and their characteristics; recording instruments and their use.

The second part of the course comprises a practical application of these features to flying, and to laying out and following air routes in different latitudes and at various seasons. It begins with a study of weather maps and forecasting, and proceeds to apply this information to the probabilities on flights supposed to be made under conditions met in selected parts of the world.

Such brief study of topography will be undertaken as is necessary to understand the help or hindrance of land forms in handling aircraft; and of topographic maps sufficient to give an idea of their use in flying. Through out this part of the course such problems as buoyancy, wind effects, and visibility will be studies as are of special importance. The lectures will be illustrated by weather maps, pilot charts and other suitable material, and the facilities afforded by the local Weather Bureau station will be freely consulted.

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Air Mail Week

Number of Pieces Mailed From Oakland for Days Shown

(*Continued from page 21*)

December

	1926	1927
15	397	846
16	377	806
17	357	910
18	358	242
19	115	1506
20	531	1948
21	686	1925
22	481	1540
23	427	1152
24	204	720
25	67	134
26	85	848
27	423	1095
28	370	840
29	330	834
30	302	813
31	304	650

January

	1927	1928
1	58	134
2	52	274
3	353	836
4	350	844
5	326	756
6	314	790
7	296	770
8	302	222
9	98	830
10	308	880
11	345	724
12	325	692
13	320	627
14	336	726
15	369	174
16	91	825
17	430	812
18	338	814
19	325	747
20	301	816
21	310	832

AIR MAIL WEEK

22	308	230
23	69	1028
24	357	1084
25	326	1014
26	210	968
27	288	1036
28	336	1000
29	294	196
30	65	.....
31	385	.....

New Engineering Service

The Potomac Flying Service, So. Washington, Va., has announced the establishment of a department of Aeronautical Engineering. The service will be under the supervision of a man who has been conducting performance tests for the Federal Government during the past ten years and the reports will bear his certification. An organization has been gathered that will make available for the industry a competent, independent, disinterested and reputable concern that can obtain exact data as to performance and advise as to design and production. The reports will constitute a valuable constructive record to substantiate the claims of the manufacturers using this service.

Model Builders' Airport

What is thought to be the first miniature airport in the United States will be dedicated February 4th at Hawley Playground, Los Angeles, by the Department of Playgrounds and Recreation in the city of Los Angeles, states the Playground and Recreation Association of America which last year launched a successful National Playground Miniature Aircraft Tournament.

A play field of many acres has been converted into the airport. The field

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Hisso "A" and "E" used pistons	1.50	1 Standard fuselage with cockpit cowl, seats, and controls	75.00
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New inner Hisso "A" connecting rods	12.50	Oil gauges	1.25
New outer Hisso "A" connecting rods	9.00	Oil gauges in 1 dozen lots	.95
Hisso Model "E" hubs, complete	10.00	Liberty hose clamps per hundred	.75
750x125 wheels, (30x5)	4.95	Thermometers	5.50
700x100 wheels (28x4)	3.00	AC Spark Plugs, each	.25
1/32 in. Waterproof plywood, 24x60, full sheets, per sq. ft.	.20	AC Spark Plugs, in lots of 100, each	.20
1/16 in. Waterproof plywood, 20x60, full sheets, per sq. ft.	.25	AC Spark Plugs, in lots of 1000, each	15

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house is being remodeled to provide a shop for building and repairing model airplanes and for the display and storage of models. The field is being equipped with most of the usual airport features, such as wind cones and wind velocity meters, under the direction of Professor A. A. Merrill of the California Institute of Technology. The equipment will also include devices for weighing and balancing the small planes and even an experimental catapult for launching model planes and gliders.

The project is arousing considerable interest in Los Angeles and has enlisted the cooperation of civic organizations, military and aviation officers, and commercial concerns.

Fokker Expands Factory

The Atlantic Aircraft Corporation has leased the ground floor of the Brighton-Mills plant at Passaic, N. J., which has given them an additional 29,000 square feet of manufacturing space. The new plant will be used for manufacturing units only, such as building fuselages, and sheet metal working. Eventually it is expected to build the veneer-covered Fokker wings in this plant. After manufacture the units will be taken to the main plant at Hasbrouck Heights for the final assembly.

Airplane Shuttle Service

Use of the airplane as a part of the standard equipment of transoceanic liners to speed up transportation of passengers and mail to and from shipboard is contemplated by the Transoceanic Corporation, recently organized under the leadership of Laurence R. Wilder, former President of the American-Brown-Boveri Electric Corporation.

Mr. Wilder and his associates are undertaking an enterprise to build and operate six trans-Atlantic liners, equipped to accommodate 25 planes each, which would be able to transit the Atlantic in four days. Employment of airplanes aboard commercial passenger ships, basically on the same principle that planes are used aboard the Navy's new airplane carriers, will represent the latest innovation in the already multitudinous uses of the airplane.

The plan for the establishment of the new line will be presented by Mr. Wilder and his associates to the United States Shipping Board on January 24. With the airplane service provided for regular shore-to-ship and ship-to-shore service, according to Mr. Wilder, the transit time for mails and passengers desiring such service would be reduced to between 24 and 36 hours under the 4-day steamer schedule, depending on weather conditions. Essentially, the provisions for airplane

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service and accommodations on the ships would mean that should persons ashore miss the liner by several hours or even a day, it would be possible for them to "catch up" by the airplane shuttle service to the ship which will continue to steam along on its chartered course. The same would hold true for late urgent mails. On the "ship-to-shore" arrangement, passengers or mail could be carried from the ship while a distance of several hundred miles from port, and thereby reduce the ship transit time to a considerable degree.

A Radio—A Chair—A Stick

(*Continued from page 19*)

ate, mention was made of what was said in the book.

Just how effective the radio advertisement was, will never be known, but there were hundreds of copies of the book sold shortly afterwards and an increased visitation to the aviation school. Undoubtedly scores of listeners were led to investigate especially after hearing Gene's soliloquy on his solo flight, parts of which follow:

"Holy Cats! Here I am, 500 feet up in the sky and no Clev in the front seat. * * * Maybe I shouldn't have done this—maybe I'm not good enough yet—maybe. Aw, rats! Clev knows his stuff. He wouldn't have let me solo if he didn't think I could do it. * * * Wonder what Clev's doing now? I'll bank and get a good slant at him. There he is, the little runt, no bigger'n a bowling pin. * * * He ain't making any motions. Just watching. Why shouldn't he? This is a darn keen bank. No skid, no slip. No wind on the cheeks. * * * Gee, this thing works just as well now as when Clev was with me. * * * Talk about having your hands full—a fellow's got his feet full, too. * * * There's Clev, waving his helmet. Guess I'd better drop back down. * * * No wind on my tail this trip. Down she goes in the glide. * * * Easy there. Round her out nice and gentle. Ooops! That left wing's a bit low. There, level as a lake. Now we're slowing. No you don't, you son-of-a-gun, I won't let you settle yet. Three feet off. Sitting pretty. Two feet. Little more stick. Ahh! A three-pointer. I knew I could do it. I'M AN AVIATOR NOW."

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—Col. Chas. A. Lindbergh in
The New York Times, Frid. Dec. 16, 1927

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Design Patented

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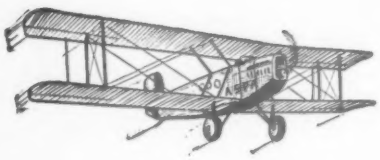

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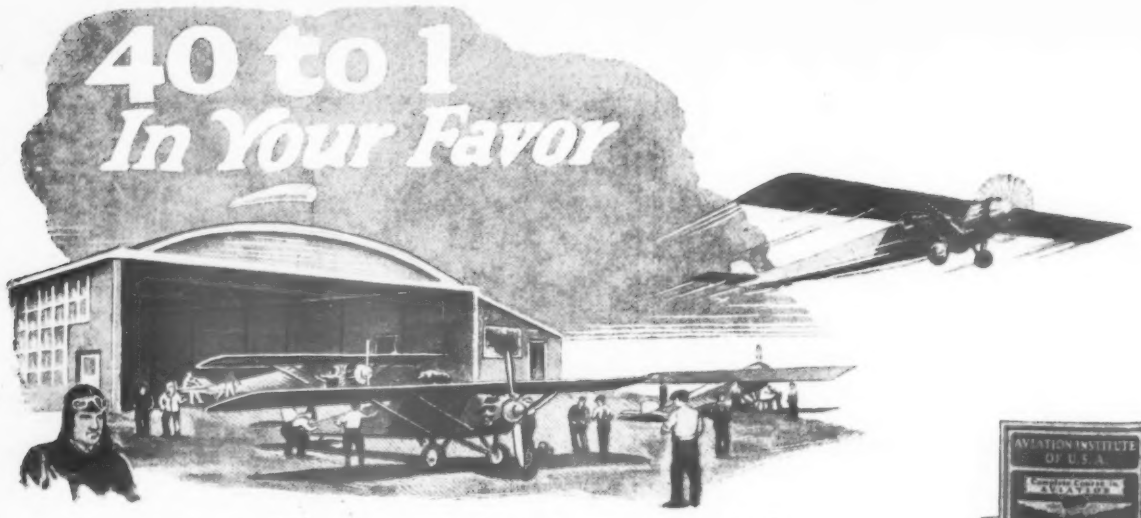

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Hinton's experience in Aviation covers practically the entire world—covers flying under every conceivable condition—covers nearly every job in the industry. On this island in the upper Amazon, Hinton and his companion were marooned for ten days during which they repaired the hull of their flying boat with such improvised materials as were available.

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